Science Library
TN
860
.W73

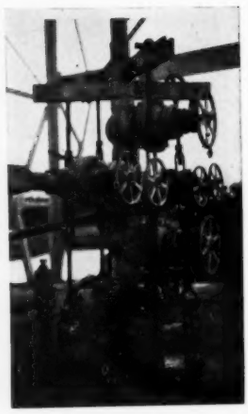
NEW YORK • LONDON

WORLD PETROLEUM

Changing Fuel Requirements for 1933 Motor Cars • Back of the Explosion in Persia • Would Guard Rise in U. S. Motor Fuel Stocks • Trinidad–Chief Source of Empire Crude • Modern Merchandising for Lubes • Acid Sludge Separation

JANUARY • 1933

FIFTY CENTS OR TWO SHILLINGS THE COPY



ELWOOD, CALIF.

KERO TEST

"Doing The Job
The World Over Since 1919"

MARACAIBO, VENEZUELA

KEROTEST

CAST STEEL

VALVES and FITTINGS

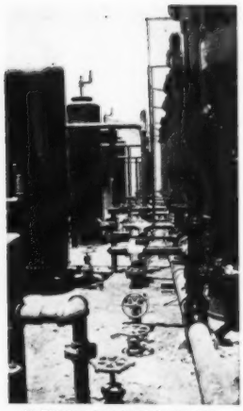
for every oil field pressure and temperature condition

LAKE MARACAIBO, VENEZUELA

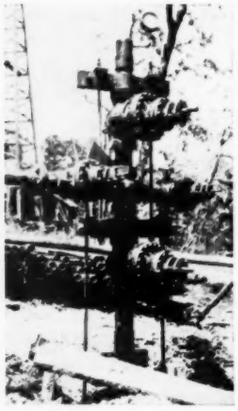
Kerotest gave the first cast steel high pressure valves to the petroleum industry, and has always built them to a quality standard.

Proved by years of engineering and field experience under every service condition,—KEROTEST products have withstood every oil field test and are rendering highly satisfactory service throughout the world.

The latest Kerotest Catalogue will be sent on request.



KETTLEMAN HILLS, CALIF.



COTTON VALLEY, LA.

KEROTEST MANUFACTURING COMPANY
Pittsburgh, Pa. U. S. A.

MANUFACTURERS OF
STEEL VALVES AND FITTINGS FOR OIL FIELD, PIPE LINE
AND REFINERY SERVICE

Carried in Stock and Sold by

OILWELL

EVERYWHERE

SPINDLE TOP, TEXAS

JANUARY
1933

WORLD PETROLEUM

VOLUME IV — **Editor, E. W. Mayo** — NUMBER 1

CONTENTS

Frontispiece 2
Editorial 3
Production 27
Finance 33

Special Articles

Changing Fuel Requirements for 1933 Cars 5
Back of the Explosion in Persia 9
Soviet Losing Ground in British Market 11
Would Guard Rise in U. S. Motor Fuel Stocks 13
Trinidad—Chief Source of Empire Crude 15
Making Acid Treatment a Continuous Process 18
Modern Merchandising for Lubricating Oils 22

Published Monthly by

RUSSELL PALMER

153 Waverly Place, New York, U. S. A.

Telephone: CHelsea 2—7398 Cable Address: Ruspam New York

Great Britain: 110 Fenchurch St., E. C. 3, London

Telephone, Mon. 2650; Cable Address, Ruspam, London

Executive-Editor, T. Orchard Lisle

Advertising Manager, S. J. Gallay

▼

CALIFORNIA OFFICE: Bendix Bldg., Los Angeles.

Subscriptions

ANNUAL subscription to WORLD PETROLEUM is offered at the flat rate of five dollars (U. S.) postpaid to any country in the International Postal Union, except in Canada where a special tax compels the publisher to charge $5.60.

For the convenience of subscribers the publisher will accept payment in any of the following currencies at the fixed rate shown below:

Argentina	14 paper dollars
Canada	5.60 dollars
Colombia	5.25 peso (gold)
France	130 francs
Germany	21 Reichsmark
Great Britain	One guinea
Holland	12.50 gulden
India	14 rupees
Iraq	One guinea
Italy	100 lire
Japan	10.50 yen
Mexico	10.50 peso (gold)
Persia	100 cran
Peru	1.25 libra
Poland	45 zloty
Roumania	835 lei
Russia	1 chervonetz
Venezuela	25 Bolivar

Remittances or drafts to the order of the Publisher, WORLD PETROLEUM, payable in New York and London.

Subscriber's name and address should be in Roman capitals on the subscription order.

Official position of subscriber is requested.

Advance notice, if possible, of a change of subscriber's address should be given. Effect cannot be given at once to a change of address. The period of transmission of the subscriber's instructions through the mail extends the time required before the magazine can be mailed to the new address.

▼

Agencies

SINGLE copies of WORLD PETROLEUM are obtainable every month, within the delay imposed by the international mail service, at any of the following agencies:

CABIMAS, VENEZUELA—The German Store
CARACAS, VENEZUELA—Casa Letcher, Torres a Madrices 22
MARACAIBO, VENEZUELA—High Life Tailors
THE HAGUE—Martinus Nijhoff, Lange Voorhout 9
LONDON—World Petroleum, 110 Fenchurch Street, E. C. 3
W. H. Smith & Sons, Ltd., Moorgate Met. Station
Willing & Co., Ltd., Moorgate Met. Station
NEW YORK—Telephone CHelsea 2-7398 for list of 20 newsstands carrying copies
PARIS—Librairie Brentano, 37 Avenue de l'Opéra
KOLN-LINDENTHAL, GERMANY—1 Laudahnstr: Director, A. J. Chambers
PORT OF SPAIN, TRINIDAD—Davidson & Todd, Ltd., 8 Frederick St.

The price of a single copy is 55 cents in Canada, 2 shillings in other countries of the British Commonwealth and the equivalent of 50 cents (U. S.) elsewhere.

▼

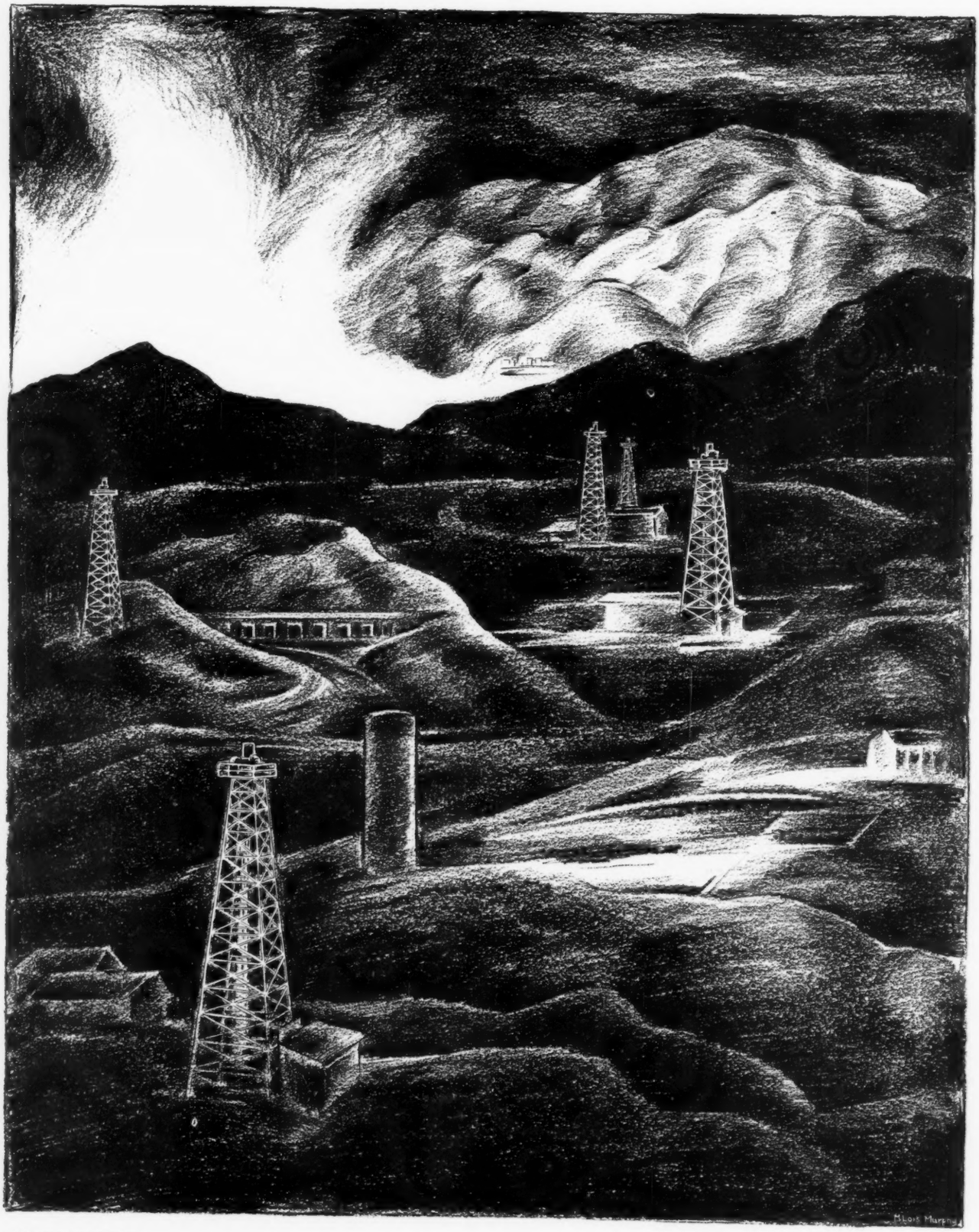
Particular Notices

CONTENTS of WORLD PETROLEUM are copyrighted by Russell Palmer, and contents may not be reproduced without permission.

Manuscripts and photographs submitted to the Editor are received only at the owner's risk. Prompt consideration will be given to them.

The Publisher does not necessarily endorse the views expressed by authors of signed articles. In the service of readers he will not hesitate to give publication to signed opinions in direct opposition to his own.

Advertising rates are scheduled in Standard Rate and Data. Copies of the schedule can be obtained on request to the Advertising Manager, 153 Waverly Place, New York, N. Y., or to 110 Fenchurch St., London, or to Bendix Bldg., Los Angeles, Cal.



Oil field at night

Persia

NEW YORK • WORLD • LONDON

PETROLEUM

Railways Treading Dangerous Ground

FINANCIAL troubles of American railways, resulting from decreased traffic, fallen revenues and continuing heavy fixed charges, have enlisted popular sympathy and have aroused the concern of holders of their securities. A substantial body of opinion favors reasonable measures of assistance to the carrier corporations. But if the railways persist in an attempt to take advantage of this friendly feeling to cripple and destroy other transportation agencies that perform an economic function no less useful than their own they will convict themselves of stupidity and short-sightedness and almost certainly will alienate the favorable public sentiment which, from their own point of view, it is most important to preserve.

Consideration of the legislation already adopted in certain states regulating the use of the public highways by motor trucks, and reports of proposals that are to be put before the Legislatures of many other states at sessions now begun or soon to begin, force the conclusion that the underlying purpose of many of these bills is not a sound control of highway traffic in the public interest but is to render impossible the employment of motor trucks in a transportation service to which they are economically suited on the assumption that this traffic will be forced to move by railway. This is short-sighted because fluidity of traffic is broadly beneficial to the railways and specifically because the motor truck brings more traffic to the rails as a complementary transportation agency than it takes away in the instances where it actually is competitive.

Widespread railway propaganda has created an impression that the motor truck is primarily responsible for the present plight of the railways. Possibly some of the railway company executives have made themselves believe this, but its falsity is easily demonstrable. From 1909 to 1929 railway freight traffic in the United States approximately doubled. This was during the period of rapid expansion in the building of improved highways and in the use of motor trucks. The heavy drop in railway freight and passenger business in the past three years reflects changed industrial conditions. The traffic that the railways have lost has not been taken over by motor trucks; most of it has gone out of existence.

Unfair and discriminatory legislative proposals have forced the users of the public highways to organize in their own defense. This organization, the National Highway Users' Conference, in conjunction with motor vehicle manufacturers and the petroleum industry, has taken a broad and public-spirited attitude on the subject of highway traffic legislation, in marked contrast to the position of many of the railway representatives. It recognizes the justice of imposing reasonable limitation upon the size and weight of motor vehicles and of requiring common carriers who use the highways to publish and adhere to regular rates. The position taken by the Highway Users' Conference and its allies actually is more to the interest of the railways than are the demands of their own representatives. The responsible officials of the railway companies would act to their own advantage by cooperating with the group represented by the Highway Users' Conference in working out a sound, fair and uniform policy of highway regulation.

▼

On the Texas Merry-go-round

TO USE a trite but thoroughly applicable expression, life to a Texas oil producer may be checkered but never dull. When he rises up in the morning, zest is added to his outlook for the day by uncertainty as to how much oil his wells will be permitted to produce or whether they will be allowed to operate at all. The one thing of which he may be sure is that their authorized output will not remain the same from week to week. Market news and production reports are of minor interest to him compared to the daily rulings of the State Railroad Commission, news of injunction suits and restraining orders and the latest decision of State and Federal courts as to what may or may not be done to him and his property under due process of law.

Within the past few months allowable production in Texas has been changed a half dozen times. The State Railroad Commission has seen its actions nullified by the courts and has received new authority designed to enable it to repeat the same acts. The Supreme Court of the United States has held that the Governor of the state was not warranted in declaring martial law in East Texas a year and more ago but the effects of martial rule are still there. The latest unexpected development was the Commission's order of December 17 closing down all East Texas wells until January 1 in order to permit a determination of bottom hole pressures as a basis for a new proration.

To an outsider it seems dizzying and incomprehensible but through it all runs the definite determination of the Texans themselves to prevent the destruction of their oil industry's

value through indiscriminate overproduction. It is noteworthy that the demand for the recent closing down order came from a meeting of East Texans. Citizens of the Lone Star State may differ violently as to details in the regulation of production but they know that too much oil will spell their ruin.

▼

Anglo-Persian Oil Situation

So SENSATIONALLY astonishing, both to the general public and the majority of the members of the petroleum industry, was the action of the Persian Government at the end of November, in denouncing the concession of the Anglo-Persian Oil Company, that all manner of guesses and surmises have been put forward by the newspapers in the effort to account for it. It may at once be dismissed as fantasy that any established oil company inspired the cancellation notice. The era of political intrigue and expensive efforts by rival companies to destroy one another has passed in the oil industry. Competition remains but the great international companies today have reached a better understanding and are closer to effective cooperation than they have been at any previous time.

The attempt in certain quarters to hold Russian diplomacy responsible for the break between the Persian Government and the oil company is perhaps not surprising, especially in view of the studied policy of the Soviet authorities of maintaining a close and influential relationship with Tehran. Some two or three years ago rumors were in circulation within the industry itself that the Persians had been told that they might obtain a far greater return from their oil properties by transferring their operation to Russian control but it never was definitely shown that there was substantial foundation for this gossip. Certainly the policy followed by Stalin and his associates in the past few years has been one of concentration on the development of Russia's home industry, a task gigantic enough for the most ambitious group.

Probably it is not necessary to go so far afield to find the underlying motive for Persian dissatisfaction with the existing arrangement. Like many another investor in petroleum the Persian Government sees its income from this source fading away in the present period of low prices and small earnings. It realizes that some basis of royalty payment other than that of profit sharing would provide a much more dependable revenue. It sees its young neighbor, Iraq, deriving a greater yearly income than its own from oil company payments although the oil of Iraq is still awaiting completion of its outlet to the sea.

There is much to be said for the Persian claim that some revision of the original D'Arcy contract should be made. It undoubtedly would be much more satisfactory to those who administer fiscal affairs at Tehran if payments were regulated by volume of production or fixed on some basis that would prevent the failure of governmental revenue from oil in times of depression in the industry. The Anglo-Persian Company has not been unsympathetic to this argument and discussions of possible changes in the agreement have been carried on at intervals over the past two years or more. In fact it was the belief on the part of the oil company officials that a practical agreement on revision was at hand that caused them to be even more astounded than outsiders at the recent summary notice of cancellation. The Shah, being a man of decisive action as his past career has demonstrated, probably concluded that a bold and spectacular step would result in speeding up action in the matter and possibly might put the Persian Government in a better bargaining position.

It must be assumed that an amicable solution of the imbroglio will be worked out. Apparently the Anglo-Persian Company has meticulously fulfilled the terms of its contract and the charges of failure in this respect seem to have slight foundation. The British Government, having purchased a controlling interest in the company in order to provide a dependable supply of oil for the British navy, cannot submit to the cutting off of this supply. Both governments now have agreed to refer the matter to the League of Nations.

It is fortunate for the Anglo-Persian Company at this juncture that it has as its executive head in Sir John Cadman a man of engaging personality who is a diplomat, who knows the situation in all its ramifications and who understands the mental processes and the viewpoint of the East. This fact in itself is a promising augury of a satisfactory settlement of the difficulty.

▼

Embarrassment for A.S.M.E.

JOURNALISTIC pseudo-science has become something of a byword and a striking illustration of it occurred in connection with the December meeting of the American Society of Mechanical Engineers in New York. In widely published articles based upon a paper presented at that meeting the assertion was made that reclaimed lubricating oil was far superior to the original product. Such a statement naturally arrests the popular fancy and exerts an irresistible appeal to the writers of newspaper headlines who promptly spread the claim that the motorist's expenditures for lubricant were about to be cut in half.

In this case, however, only a minor part of the responsibility for the spread of a fallacious notion can be placed upon the editors who gave it currency. A press release summarizing the paper in question and playing up its sensational features was the basis for the published articles and undoubtedly its contents were given prominence because it was assumed to have the authority or at least the sanction of a highly reputable engineering organization. Except for its connection with the A.S.M.E. the paper and its contents would have received slight attention.

The theory advanced by the authors of the paper referred to appears to be that if the oxides and gums resulting from the use of oil in an engine are completely removed by reclaiming the result will be a product incapable of further deterioration and hence superior to the original. Among the tests quoted to show the actual superiority of reclaimed lubricant was one in which it was stated that a motor car which stalled repeatedly in attempting to climb a hill while using the best grade of Pennsylvania lubricating oil doubled its speed on the same ascent after its crank case had been refilled with reclaimed oil.

As the only way in which a lubricant can contribute to the power of an engine is by the extent to which it overcomes friction and as the efficiency of a good gasoline motor is higher than 85 percent it appears that in this case the reclaimed oil possessed somewhat miraculous qualities, not only overcoming friction completely but also instilling additional power into the motor in some mysterious way.

Without impugning the sincerity or the motives of those who sponsored the particular paper referred to it may be remarked that claims have been advanced before this by persons interested directly or indirectly in the commercial reclamation of oil that the product of the process in which they were interested was superior to newly produced lubricant but it can hardly be said that these claims have received scientific sanction. Members of the petroleum trade are familiar with reclaiming methods and with their practical limitations. The point we wish to make is that it is unfortunate that through laxness or oversight a body of the standing of the American Society of Mechanical Engineers should be placed by the general public in the position of being responsible for the claims advanced in a paper of this sort and, more particularly, in the press release based upon it.

Changing Fuel Requirements for 1933 Cars

Modified Designs for 1933 Models Affect Types of Fuel and Lubricant Required. Present Streamlining Not to Curtail Motor Fuel Requirements.

By Fay Leone Faurote B.S., M.E.

DESPITE vague prophecies that this year might see the showing of some automotive engines operating upon other cycles than the familiar four-stroke cycle, no such power plants have so far appeared. One manufacturer has asserted, however, that any commercial vehicle manufacturer who is not prepared to equip his product with a Diesel engine this year may be left by the wayside. It is an open secret that considerable work is being done behind closed doors on internal combustion powerplants using other than Otto cycle, and another season may see some of these new powerplants installed in experimental models.

The Cooperative Fuel Research Committee, after five years' intensive work on detonation conducted on the C.F.R. engine and at the Uniontown, Pa. out-door tests reports much that is of great interest to both the petroleum industry and automotive engineers.*

In the summer of 1930 at a conference at French Lick, the now well-known system of octane numbers was agreed upon by members of the Cooperative Fuel Research Committee. It was formally adopted by the Society of Automotive Engineers in January, 1931. Thus, there was set up a common language, by means of which all might designate with accuracy the relative anti-knock abilities of fuels and engines. This was undoubtedly one of the most important steps ever taken by the two industries. International experts who were present on this occasion were in entire agreement with the work as it was being carried on and have since set their seal of approval on the project. The octane number is today accepted throughout the world. A concomitant development in detonation research was that of a precision laboratory engine by means of which the anti-knock qualities of engines and of fuels might be calibrated. While a few months earlier refiners were offering supposedly good grades of gasoline, both in standard and premium forms, there existed no common method whereby the anti-knock value of these fuels might be measured. With the setting up of the octane number scale however, and the development of this C. F. R. detonation testing unit, a method of comparison satisfactory to all made its appearance. During the last year the C.F.R. Committee has succeeded, not only in perfecting this laboratory method, but has demonstrated by its Uniontown trials that fuels of a known octane rating can be made to show comparable results on the road: they here demonstrated that fuels that knock at low speeds may not be so bad at higher speeds; that others that do not knock at low speeds may knock badly at higher velocities. For the first time two great industries have demonstrated their mutual confidence and have staked both their money and reputation on results which came as a culmination of ten years of intensive cooperative research. Engine designers now know how to buy fuel, and how to test it; how to design engines with reference to compression ratios, temperatures, turbulence factors and combustion-chamber characteristics.

It is possible as a result of this world-wide cooperation, to measure anti-knock fuel values in London, Paris or Singapore, and to make sure that they are as accurately comparable as when measured in Chicago, San Francisco, or New York. Premium fuels and standard fuels can be defined. Refiners may offer with confidence products which will produce known results in automotive performance.

In some parts of the Middle West, notably as reported in the State of Ohio, fuels combined with a lubricant are on sale. The theory is that if the public wants such a combination, stations are prepared to fill its tanks with a hydro-carbon which will give not only fuel units, but lubricating qualities as well. This new method aims to furnish additional above-the-piston lubrication, which will reach the valves and other top-of-the-head moving parts.

In passing, it may be well to emphasize also the progress that is being made by the S.A.E. in the solution of the extreme-pressure lubricant problem. This study has been desirable, because of the increased power and new designs of rear axle gears. There is a diversity of opinion and at present no known method of calibrating lubricating ability. What seems to be good for gears under one condition, has been proved to be bad for rollers in another. One manufacturer claims that the lubricant used by his company is ideal, while another objects to it, saying that the use of such a lubricant would ruin the mechanism of his product. Consequently, it is deemed advisable for the Society to bring together all of these men and attempt to work out a satisfactory basis. It is likely that 1933 will see a reconciliation of all methods of testing. and the putting forth of a standard type of machine that will make lubricant calibration possible. The Bureau of Standards experts are also re-designing their friction machine to study the effects of viscosity and friction with a view to arriving at a standard method of testing.

1933 Engines

THERE is a continuation of multi-cylinder engines, better balanced both dynamically and statically.

Compression ratios continue to rise. It is the opinion of many of the automotive engineers that 1934 will see a still greater increase in this regard. Ratios of 5.5:1 and 6.5:1 are now common. With the new aluminum heads and special means for controlling temperatures and turbulence in the combustion chamber it is stated that compression ratios may be safely carried higher. New forms of gaskets and heads may be needed, of course, but these are being developed. Fuels are keeping pace with this advance.

Carbureters continue to show marked improvement. There is a continuance of the down-draft type with clever means for assuring quick starting; improved strainers, dust eliminators, provisions for diversion of water which may enter the hood through ventilator louvers, screens to shut out insects and many other such refinements.

The new engines have muffled intakes and exhausts, unique valve mechanisms with inlaid valve seats. Tungsten-chromium nickel alloy is used, as are Stellite-faced valve seats screwed into nickel-iron cylinder heads. Port open-

* Correlation of C.F.R. Laboratory Knock Ratings with Behavoir of Motor Fuels in Service C. B. Veal, H. W. Best, J. M. Campbell, and W. M. Holladay: presented at the 13th Annual Meeting of the American Petroleum Institute.

ings have been increased and in some engines given a Venturi form to increase the mixture flow. Engine speeds of from 3,500 to 4,500 r.p.m. are common, and there are predictions of a higher number of revolutions as the mass of the reciprocating parts comes down. Valve tappets have been lightened and heavier valve springs used.

Yet low speed performance is pleasingly smooth. Almost all of the new cars can be throttled down to a snail's pace without perceptible carbureter trouble. Both acceleration and deceleration are faster and performance on hills and mountain roads is surprisingly good.

Facts revealed by research on vapor lock, have enabled designers materially to cut down this cause of trouble and stoppage in the fuel system.

Better designs of inlet manifolds and improved mufflers contribute to the elimination of noise.

Not only in passenger cars, but in motor trucks, motor coaches, and in railway power cars just entering the market, there is a noticeable advancement in engine design and economy of operation. It is likely that transportation costs, providing the troublesome problem of taxation can be solved, may be materially reduced in 1933.

Transportation experts predict that this year will see a gasoline consumption in excess of 15,000,000 gals. with a total estimated public expenditure of $11,000,000 for travel. This is predicated upon an average cost of operation at 6.4 cents per mile, an average gasoline consumption of 12 miles to the gallon, and the total distance traversed of 180,000,000,000 miles. Judged from other figures available this would seem to be a conservative estimate.

Certainly automobile makers have shown their confidence in the coming year by putting large sums of money "on the line." One maker says that he already has expended more than $9,000,000 in experimental engineering, design and retooling for his 1933 product. Another well-informed executive in the industry believes that 20 of the 37 makers showing new products at the show at the Grand Central Palace have spent more than $50,000,000 in preparation for 1933, and the end is not yet.

Generally speaking, the 1933 automobile is safer, stronger, faster, roomier, more economical and better looking. To quote A. J. Scaife, President of the Society of Automotive Engineers, Inc.,

> The new cars have a versatility that was not heard of a few years ago. A good car can now be had at one-eighth of the sale price of a much less attractive car of ten years ago. Cars in the low-priced field are now built to maintain high speeds up to 75 m.p.h. and many will go faster with safety. There is better engine performance at low speeds, better acceleration at high; the self-same vehicle will do as well on hills as on the level. Furthermore, high speed on rough roads is possible, particularly with independently-sprung wheels. Fine brakes have been installed, too.

Although no American cars show such decided stream lined forms as some of the foreign makes, there are timid gestures toward this admittedly more efficient form of body. Generally speaking, one finds more general curves, more rounded corners, smoother exteriors, than have been discernable in former years. This tendency is also evidenced by lowered roofs, inside visors, concealed hinges, cleverly shaped lamps and stream lined hoods with projecting radiators; all of which show a general, though gradual approach to the aerofoil surface. When the question is asked, why the engineers have not gone to the extreme forms which are known to be more efficient, the answer is given that the sales departments do not feel that such radical changes in bodies and locations of powerplants would be accepted by the buying public. Probably they are right. It took four years to sell buyers away from the rear entrance tonneau and get them to accept the four-door side entrance cars, and this in spite of the obvious advantages of the side entrance, especially in the mud-covered streets of thirty years ago. Radical innovations are not easy to promote. The American public in spite of its so-called progressiveness is really quite conservative, much more so than France, England

1933 Automobile Engines

Car	Model	No. Cyl.	Cylinder Arrangement	Bore Stroke	Displacement—cu.in.	Compression Ratio	Max. H.P.	R.P.M. at Max. H.P.
Buick	50	8	in line	2 5/16" x 4 1/16"	230.4	5.25	86	3200
Buick	60	8	in line	3 1/16" x 4 5/8"	272.6	5.25	97	3200
Buick	80–90	8	in line	3 5/16" x 5"	344.8	4.8	113	3200
Cadillac 8	345C 355C	8	V90°	3 3/8" x 4 13/16"	353.	5.4	115	3000
Cadillac 12	370C	12	V45°	3 1/8" x 4"	368.	5.6	135	3400
Cadillac 16	452C	16	V45°	3" x 4"	452.	5.7	165	3400
Chrysler 6	CO	6	in line	3 1/2" x 4 1/2"	224.	5.35	83	3400
Chrysler Royal 8	CT	8	in line	3 1/4" x 4 1/8"	273.8	5.2	90	3400
Chrysler Imperial 8	CQ	8	in line	3 1/4" x 4 1/2"	298.6	6.2	108	3400
Chrysler Imperial Custom 8	CL	8	in line	3 1/2" x 5"	384.8	5.8	135	3200
Continental Beacon	C400	4	in line	3 3/8" x 4"	143.12	5.05	40	2700
Continental Flyer	C600	6	in line	3" x 4"	169.64	5.21	65	3500
De Soto	SD	6	in line	3 1/4" x 4 3/8"	217.7	5.35	79	3400
Dodge 6	DP	6	in line	3 1/8" x 4 3/8"	201.3	5.5	75	3600
Dodge 8	DO	8	in line	3 1/4" x 4 1/4"	282.1	6.2	100	3600
Graham 6	Std. 6	6	in line	3 1/4" x 4 1/2"	224.	6.5	85	3400
Graham 8	Std. 8	8	in line	3 1/8" x 4"	245.4	6.5	95	3400
Hudson Super Six	SS6	6	in line	2 13/16" x 4 3/4"	193.	6.2	70	3200
Hudson Terraplane	T8	8	in line	2 13/16" x 4 1/2"	245.	5.8	94	3200
Oldsmobile 6	F33	6	in line	3 3/8" x 4 1/8"	221.4	5.3	80	3200
Oldsmobile 8	L33	8	in line	3" x 4 1/4"	240.3	5.5	90	3350
Pierce Arrow	836	8	in line	3 1/2" x 4 3/4"	366.	5.5	135	3400
Pierce Arrow	1236	12	V80°	3 3/8" x 4"	429.	6.0	160	3400
Plymouth	PC	6	in line	3 1/8" x 4 1/8"	189.8	5.5	70	3600
Pontiac	P8	8	in line	3 5/16" x 3 1/2"	223.4	5.7	77	3600
Studebaker 6	56	6	in line	3 1/4" x 4 5/8"	230.	5.5	85	3200
Studebaker Commander	73	8	in line	3 1/16" x 4"	236.	5.5	100	3800
Studebaker President	82	8	in line	3 1/16" x 4 1/4"	250.4	5.5	110	3600
Studebaker President	92	8	in line	3 1/2" x 4 5/8"	337.	5.5	132	3400
Willys 6	99	6	in line	3 5/16" x 4 1/8"	213.3	5.26	80	3400
Willys 4	77	4	in line	3 1/8" x 4 3/8"	134.	5.1	45	3200

or Germany, where many stream lined cars with motors in the rear are being driven.

Fuel Consumption

IT IS KNOWN that many American manufacturers are conducting wind tunnel experiments on models of unique stream lined design. One investigator has demonstrated to his own satisfaction that a greatly reduced gasoline consumption will result from the use of a properly designed stream lined body. Indeed, in one set of experiments it was shown that the gasoline consumption could be cut in two. While the motoring public in England and Germany seems willing to accept such unusual body forms for the sake of the lowered cost of operation, Americans still put style ahead of economy. Furthermore, many designers point out that the real value of a stream lined car depends upon the speed at which it is normally driven; only at high speeds is it so economical. With the present condition of our highways excessive speeds are not desirable or permissible so that in the case of the carefully stream lined job, the advantage is not so great as to warrant a radical change for this alone. Rear engine mounting, better seating, better weight distribution, better spring suspension, better ventilation and other details affecting the comfort of the occupants of the car may however bring about predicted changes in exterior form. One such English car was shown in America last year, and several will be on the roads in America during 1933.

One important change in power-plant construction is seen in a commercial vehicle which has introduced a 12-cylinder horizontal engine, the object being to save space and secure a low center of gravity. Another maker is using a supercharger. Hydraulic valve lifters, center-of-gravity adjustment of connecting rods, automatic chokes, are other details of interest in engine construction. The use of the eight cylinder engine in trucks is increasing. The Diesel principle is finding some acceptance with automotive engineers, but as yet is confined to commercial vehicles.

Metallurgical achievements during the past year have yielded a special alloy iron used for cylinders. It shows great resistance and it is said that cylinders built of this material have been run 50,000 miles without valve grinding. Other makers have used molybdenum iron made in electric furnaces, also nickel-chromium. Cylinder heads are being made of aluminum alloy and of combinations of cast iron and aluminum alloy. It is claimed that an aluminum head with no other changes in the engine except an increase in the compression ratio will make possible an increase in power of from 10 percent to 15 percent.

A new electric-furnace cast iron alloy containing molybdenum chromium and nickel is being used for camshafts. By its use a saving has been made over the former forging process and its attendant operations.

A phenolic material has been developed for camshaft drive use. Its claimed advantages include quietness, low operating temperature and reduced wear.

Narrow piston rings, nearly all $\frac{1}{8}$ inch wide compression rings with aluminum alloy or tin-plated cast iron pistons are popular. Four piston rings and two oil rings are the choice of many. One maker has five. Piston and piston rings have been under careful study during the past year and many refinements in ring practice with special relation to efficiency in high compression engines are the result.

Connecting rods continue to show a trend toward the use of steel-backed babbitt-lined replaceable bushings in the large end. There is a tendency, too, to match sets of connecting rods, piston, piston rings and pins more carefully.

Lubrication

SOME of the lower priced cars still cling to the splash system of lubrication while three of the group have gone to full-pressure feed, with the exception of the piston pin. Oil temperature regulators are used on several cars although one well known type has dropped it this year. Crankcase ventilation is continued by all who incorporated it last year. Oil filters are still in vogue.

Higher engine speeds and greater outputs have demanded larger and better cooling systems, many controlled by thermostats.

One manufacturer of automotive accessories shows an automatic choke supplemented by an automatic idling adjustment permitting the engine to "idle" at greater speed when cold than when hot. Another carbureter is automatically controlled by a thermostat; a tunnel permits air from behind the fan to be conducted to the thermostat. A shutter connects with the throttle where it is controlled so that correct mixture temperature is maintained. Engineers using this device claim an ability to raise compression several pounds by such control. Another automatic heat control is effected by deflecting all of the exhaust gas thereto through the closure of a weighted valve. The pressure of the exhaust opens the valve and shuts off the heat when the engine has warmed up and the throttle is opened.

Several of the new cars have the filler-cap of the gasoline tank on the left-hand side so that the fuel tank may be filled full when the car is standing on the side of a crowned road.

An "octane selector" on a popular small car permits hand adjustment of the spark to compensate for the detonating tendency of the fuel in use.

Summary

BRAKES generally have smaller diameters and wider drums. Completely automatic transmissions have been designed and will be incorporated as fast as the public is ready for them. Free wheeling in one form or another is found on nearly all small and medium priced cars although two still refuse to add it to their specifications.

Floating power or its equivalent is gaining in popularity. Easy gear shifts are continued in several forms. Much has been done to eliminate vibration and secure silent operation. Air wheels or "dough nuts" as they are called may be widely used although there is some disagreement as to their ultimate regular use. They add many problems and call for perfect alignment, correct inflation, tighter snubber adjustment, a good steering setup and frequent replacement of worn parts if best results are to be obtained. They will probably be inflated to ten to fifteen pounds instead of the thirty or forty now used. These tires measure from 30 to 40 percent more in width than the older balloons.

In summation it may be said that while the early 1933 engines will not benefit greatly in design by the gasoline and oil research reports that have just been made, it is likely that both fuel men and automotive engineers soon will take advantage of the facts now before them. They will demand a fuel of a proved anti-knock rating. An important paper to be given on January 26, 1933, at the Annual Meeting of the Society of Automotive Engineers in Detroit by C. B. Veal, H. W. Best, J. M. Campbell, and W. M. Holaday will define for the automotive engine what a similar paper given recently at the American Petroleum Institute meeting did for the refinery. Thus not later than 1934 may be seen power plants that will be much less sensitive to "knock," with more speed, greater acceleration, greater horse power per cubic inch of displacement and better cooling. Whether this will be brought about in one or two radical ways now known or by a proper combination of several changes in design indicated by the tests will, of course, depend upon how the individual designers handle the problem involved. Certain it is that the behavior of fuels in service is now much better understood and the general public as well as the two industries will be the gainers.

Year's Major Drilling Development in U.S.

Gulf Coastal Fields Attracting Texas and Oklahoma Wildcatters. Being Conservatively Developed. Conroe and Rabbs Ridge Activities Reviewed for 1932.

DURING 1932 wildcatting in the United States moved definitely away from Northeast Texas and toward the Gulf Coast. Wildcat operators from Oklahoma and Kansas also invaded coastal counties of Texas, Louisiana and Mississippi. While operators from Northeast Texas moved to the Gulf Coast because their efforts to find extensions to the Rusk-Gregg field were unsuccessful, operators from Oklahoma and Kansas preferred the Coast because of the less stringent proration laws, more particularly because the Texas Legislature emphasized in its several new statutes the exemption from proration of new fields until their production reaches 10,000 bbl. per day, while in Oklahoma discovery wells are allowed but 50 bbl. per day for several months after completion; also the Gulf Coastal area is near the sea routes and the small operators are less dependent on major crude oil purchasing companies. The prospective and semi-proven oil fields on the Gulf command greater interest and value, are more easily disposed of to major concerns and are therefore more attractive to the wildcatters.

The old development in the Gulf coastal area followed fairly closely the coast line and relatively few pools have been located further than 20 to 30 miles away from the Gulf. During 1932, as a result of the development of the Conroe field, 75 miles inland, wildcatters have definitely and actively entered the second and third tiers of counties away from the coast. Modern rotary drilling equipment is ideal for the Gulf Coast.

The accompanying table classifies the undeveloped discoveries of last year according to their relation to the Gulf Coast, and also furnishes details of their present conditions.

Coastal

1. United North and South Development Company No. 1 Stoddard. Matagorda County, Texas (20 miles from the coast). 1,850 bbl. of 38.6 gravity oil from 7,924 ft. Discovery well now producing. Prospect is reported for sale.
2. Danciger Oil and Gas Company No. 1 Hunt. Brazoria County, Texas (15 miles from the coast). Encountered heavy wet gas flow at 6,782 ft. Discovery well uncompleted.
3. Bunte and Gulf Production Company No. 1 and 2 Keeran. Victoria County, Texas (40 miles from the coast). 1,500 bbl. of 37 gravity oil from 5,851 ft. Under development.

Inland

1. Coyle Concord Oil Company No. 1 Nelson. Colorado County, Texas (60 miles from the coast). Encountered heavy wet gas flow at 4,052 ft. Uncompleted.
2. D. Shwabb and Shell Petroleum Company No. 1 Davis-Holmes. Polk County, Texas (60 miles from the coast). Discovery well encountered heavy gas flow at 4,438 ft. Second well drilled had oil and salt water, semi-proving the field for oil production. To be further prospected.
3. Republic Production Company and Houston Oil Company No. 1 Sterne. Tyler County, Texas (50 miles from the coast). Encountered heavy gas flow at 4,708 ft., but later the well died. Second well is now drilling.

Coastal—Louisiana

1. Rio Bravo Oil Company and Gulf Production Company No. 1 Darrow. Ascension Parish, Louisiana. Reported as making 100 bbl. per hour from 4,035 ft.

The Conroe field, in Montgomery County, discovered in December of 1931 by G. W. Strake et al No. 1 South Texas Development Company, proved to be the major development in the United States during 1932. The discovery well completed on December 13, 1931, as well as the first extension well completed early in April of 1932, were both gas wells and it was not until May 21, 1932, that the first oil well was brought in by the Strake Oil Company good for 1,000 bbl. of oil and 10,000,000 cu. ft of gas from a depth of 5,030 ft.

Humble Oil and Refining Company (S.O.N.J.) became interested in the Conroe field in March of 1932 when it purchased from the Strake Oil Company about 4,400 acres for $500,000 cash and $3,500,000 to be paid out of one fourth of the first oil produced. Later Humble Oil and Refining Company acquired a number of additional leases within the proven area of the field, bringing its total holdings to some 7,900 acres, of which, however, about 3,000 acres of the original purchase have been condemned by dry holes on the northwest flank of the field. Tidal Oil Company entered the field only in November of 1932 by purchasing full and partial interests in some 2,500 acres. The Texas Oil Company owns in the Conroe field approximately 800 acres of proven leases. The total definitely proven area of the field is now estimated at about 10,000 acres, while the field may eventually cover between 15,000 and 17,000 acres.

By December 31, 1932, Conroe field had 100 producing wells with a conservatively estimated potential of 250,000 bbl. per day, and an allowable production of 20,000 bbl. per day. Some 50 projects were active in the field at the close of the year. The cumulative production from Conroe during the 10 months of its life was 2,565,000 bbl., of which 2,533,000 bbl. were recovered in the last five months.

The Rabbs Ridge - Clear Lake salt dome field discovered in May, 1931, was conservatively developed during 1932. The field is almost wholly owned by the Humble Oil and Refining Company and the Gulf Production Company. Humble Oil and Refining Company purchased its half interest in the Rabbs Ridge from Cullen and West, independent operators of Houston, in May, 1932, for $3,000,000 cash and $17,000,000 to be paid from one quarter of the first oil produced; the Gulf Production Company owned its half interest originally.

The proven area of the field is estimated at about 4,000 acres. Production is derived from four Miocene sands encountered at 3,050 ft., at 3,150 ft., at 3,500 ft. and at 3,900 ft., and from one Oligocene sand encountered at about 5,250 ft. The production from Miocene sands varies from 200 bbl. to 1,000 bbl. per day, and from the Oligocene sand it averages 1,200 bbl. per day through 3/8-inch choke. Currently all development is concentrated on the deep Oligocene sand, which produces 25 gravity oil.

A total of 30 oil wells were completed in the Rabbs Ridge field to date, of which all but two producers are owned by Humble-Gulf companies on a 50-50 basis. Production from the field reached 730,000 bbl. in 1931, increasing from 55 bbl. per day in May to 8,493 bbl. in December, while in 1932 it produced as high as 19,000 bbl. in October, but was curtailed back to 10,000 bbl. per day by the end of the year. Cumulative recovery of the Rabbs Ridge pool to the end of 1932 was about 4,500,000 bbl.

Back of the Explosion in Persia

Chain of Events Leading Up to Government's Attempt to Cancel Anglo-Persian's Concession— Falling Off in Revenue Direct Cause of Trouble. Arbitration by League of Nations Agreed Upon.

SENSATIONAL news was conveyed in despatches from Tehran on November 27 announcing that the Persian Government had served notice on the resident representative of the Anglo-Persian Oil Company that the company's concession had been cancelled. As there had been no published forewarning of such a step it broke with startling suddenness upon press and public and led to all sorts of surmises as to the hidden motive which was immediately assumed to be responsible for such drastic action.

Direct connection of the British Government with the Anglo-Persian Oil Company as its largest and controlling stockholder made it easy and natural for press commentators to attribute the attempted cancellation to Russian intrigue as a measure of reprisal for termination of the Anglo-Soviet trade agreement. Others, seeking greater originality, attempted to explain the action as the result of machinations by competing oil interests and one London newspaper asserted that it was inspired by Standard Oil without troubling to specify which of the several Standard companies was to be held responsible.

It is revealing no secret to say that the decision of the Persian Government was no less astounding to the officers of the Anglo-Persian Oil Company than to the average newspaper reader, but for a very different reason. Their surprise was caused by the fact that for the past four years, intermittently at least, discussions have been proceeding between the representatives of the company and officials of the Persian Government looking to a revision of the contract. On the part of the company these negotiations were undertaken, not because they admitted the existence of any question as to the validity of their contract but out of desire to reach an arrangement more satisfactory to the Persian authorities. Less than a fortnight before the contract was denounced the company had been notified that a proposal drawn up under the direction of the Persian Government and embodying its ideas of a satisfactory agreement was practically complete and would be shortly ready for submission. Under these circumstances the summary notice of cancellation fell like a bombshell.

To supply the background of the present situation it may be desirable to set down very briefly an outline of Persian oil development. The concession to explore for oil and to develop oil resources was granted originally to William Knox D'Arcy in 1901 by the then Persian Government. The contract was signed by the Shah and his Prime Minister and was countersigned by other Ministers, the signatures being certified by the British Vice Consul at Tehran. It covered some 500,000 square miles or approximately five-sixths of the area of the Persian Empire as then constituted. The Government's compensation was to be 16 percent of the net profits arising from the operation of any oil properties that might be developed.

The only clause providing authorization for voiding the contract was a stipulation that a company to operate the concession should be established within two years. This requirement was met by the formation in 1903 of the First Exploitation Company. Through that company Mr. D'Arcy and his associates during a period of seven years spent hundreds of thousands of pounds in proving the existence of oil in commercial quantities. This was done without expenditure or risk on the part of the Persian Government.

In 1909 the Anglo-Persian Oil Company, Ltd. was formed to acquire the D'Arcy concession and has operated it since that time. The validity of its title has been recognized by all successive governments including the one now in authority.

The Anglo-Persian Oil Company has been one of the main financial props of the Persian Government and, besides, has contributed greatly to the industrial development of the country through the building of roads and pipe lines and the operation of its wells, refinery and tanker fleet, giving employment to some 30,000 Persians. Its relations with the Government always have been most cordial and while differences have arisen from time to time over financial settlements these, in the past, have been adjusted by friendly negotiation.

It becomes interesting, therefore, to examine the reasons advanced by the Persian Government for attempting to abrogate its agreement with the most important industrial organization in its territory.

These reasons, as set forth in the notification delivered to the company, are as follows:

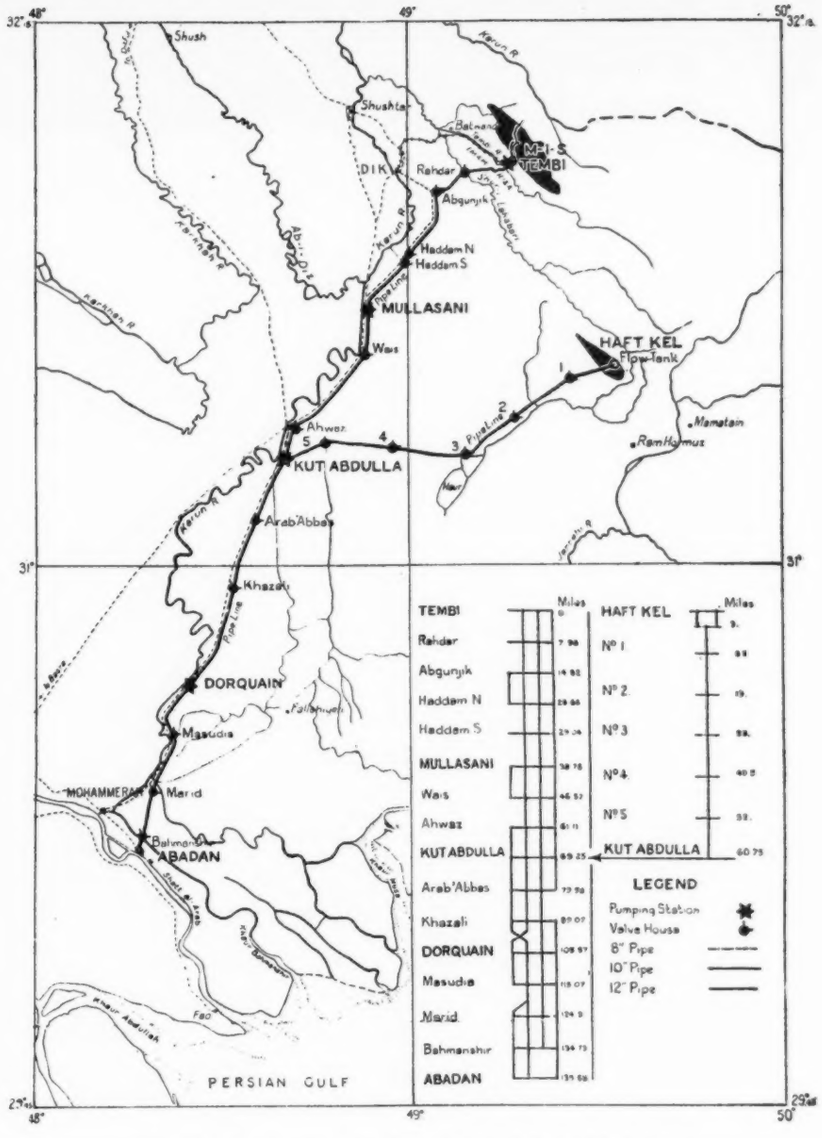
> The Anglo-Persian Oil Company has been repeatedly informed by the Persian Government that the D'Arcy Concession of 1901 does not protect the interests of the Persian Government and that it is necessary to place the relations between the Imperial Persian Government and the company on a new basis, which will provide for the real interests of Persia. The defects and short-

Masjid-i-Suliman field with Anglo-Persian headquarters in center.

comings of the D'Arcy Concession and its disagreements with Persian interests have been repeatedly pointed out, and, of course, the Persian Government cannot legally and logically consider itself bound by the provisions of a Concession which was granted prior to the establishment of the constitutional regime, in view of the manner in which such Concession was obtained and granted at that time. . . . At the same time the Persian Government has no other intention except to safeguard Persian interests and should the Anglo-Persian Oil Company, contrary to the past, be prepared to safeguard Persian interests, in accordance with the views of the Persian Government, on the basis of equity and justice, together with the necessary security to protect those interests, the Persian Government will not in principle refuse to grant a new Concession to that company.

As revealed by the foregoing the Persian authorities rest their case upon two points: one is that the concession to the company does not protect the interests of the Persian Government; the other is that it was granted before the establishment of the constitutional regime. As the company hastened to point out neither of these complaints justifies the cancellation of the contract as the obligations of the company to the Government have been regularly fulfilled and as the validity of the agreement has been recognized by successive governments from the time of its original granting down to the present.

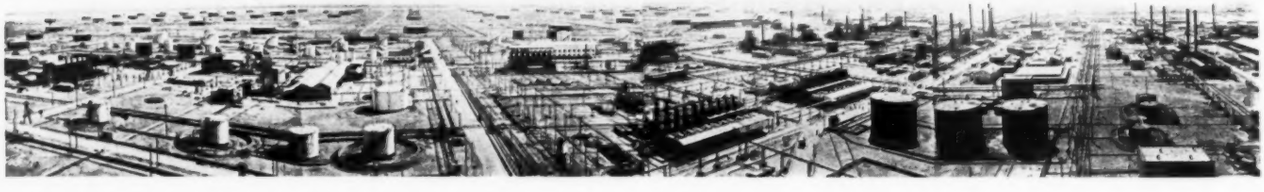
Dissatisfaction with the revenue received under the terms of the concession undoubtedly is the fundamental reason for the restiveness which the Persian Government has shown in connection with it for a number of years past. It is not denied by those who have studied the case that the basis of payment provided is unsatisfactory to the Government from some points of view. That clause in the contract providing for a share of "net profits" contained the seeds of future trouble, especially since it gave no indication as to how profits were to be determined. The oil industry is one of many uncertainties and as the agreement stands no income accrues to the fisc when there are no profits, regardless of the quantity of oil produced and sold.



Map of Persia showing Haft Kel and Masjid-i-Suliman fields and pipe line to Anglo-Persian refinery at Abadan.

After the formation of the Anglo-Persian Oil Company in 1909, the pipe line was built and commercial production began in the year 1912, and within three to four years the company reached a profit earning basis and payments to the Persian Government were commenced. Very soon after differences of opinion arose as to the manner in which the Government's share of earnings should be computed. Out of the discussions over this subject came a settlement in 1920 by which the company paid £1,000,000 in settlement of all claims to that date. Advice of eminent lawyers was that some of the Government's claims could not be substantiated but the company adopted a liberal course.

Anglo-Persian's Abadan refinery; daily capacity 100,000 bbl.



During the years of prosperity for the oil industry that followed 1920, payments to the Persian Treasury were sufficiently high so that no serious criticism of the agreement was heard. The accounts were audited yearly by accountants employed by Persia and minor differences were adjusted without trouble. In 1928 the Government brought forward a suggestion for revision of the contract. A group of directors, lawyers and accountants of the Anglo-Persian Company, headed by the Chairman, Sir John Cadman, visited Tehran and spent two months in discussions of proposed changes. Many of the points of difference were ironed out in these conversations but the company officials were unable to accept in their entirety the demands of the Government for increased participation in earnings and the matter went over. Further discussions took place during the following year and early in 1932 a preliminary agreement was reached which was approved by the Council of Ministers in Tehran in February of last year.

When payment of royalty for the year 1931 became due in June of last year the Persian authorities were decidedly upset to find that the sum coming to them was only £306,872 as compared with £1,288,-312 received for 1930 and much larger payments in some previous years. It had been pointed out to them repeatedly that flush times would not endure forever in the oil business but apparently they had not counted upon any such drop in income. They refused to accept it and stated that a new agreement would be drafted embodying their ideas.

The position of the company, as expressed by Sir John Cadman on this and previous occasion, was that the company was willing to accept a modification of the agreement that was based on realities and was fair to both parties, that when such a revised contract had been ratified the old one would be torn up, but that the company could not recognize any claim that the original concession was lacking in validity.

If the Anglo-Persian Oil Company were a privately owned British corporation the British Government could not stand idly by and see its property confiscated. It happens, however, that Great Britain owns the controlling interest in the Company, holding 7,500,000 of the outstanding 13,425,000 ordinary £1 shares, 1,000 of the £1 preference shares and 199,000 of the 5 percent debentures. Consequently the British Government has a direct financial stake in the maintenance of the company's rights. British Foreign Office officials promptly made protest to the Persian Government against its cancellation order and further exchanges between the two governments have been proceeding since. This puts the matter in the realm of international relations which accounts for the agreement to refer it to the Council of the League of Nations.

▼

Soviet Losing Ground in British Market

Russian Exports to United Kingdom Experienced Decline of over 2,000,000 bbl. in Nine Months of 1932. Loss in Bulk Sales Followed Termination of Former Group Contracts.

LONDON

SINCE the termination of the international oil conference in New York last June, Russia's penetration into additional petroleum distributing markets and her steps to obtain a firmer hold on outlets previously established, have received widespread publicity. Reports from many quarters of the world, including France, Japan, Germany, Canada and Egypt, have conveyed the impression of attempts being made in many directions to expand Soviet markets. While some of these transactions have received an amount of publicity quite disproportionate to their commercial importance it is unquestionably true that there has been a determined effort on the part of the Russian oil industry to extend its exports.

One reason for this eager search for new outlets may be found in the fact that in Great Britain, Russia's principal market heretofore, imports of her petroleum products have shown a serious decline during 1932. In fact, official figures for the first nine months of the year show a drop of over 2,000,000 bbl. compared with the same period in 1931.

It was not the New York conference or the Paris meeting that changed Russia's marketing position in Great Britain, as the subsequent petrol price increase had the effect of enabling the Soviets to secure more money for the products marketed by the R.O.P. (Russian Oil Products Ltd.) in this country. In one way this has strengthened the financial side of their British operations. On the other hand Soviet endeavors at market expansion in other directions have led to drastic competitive steps by the major groups, which have had the effect of greatly reducing imports of certain Russian oil products into Great Britain.

It is understood that during recent months the sales of motor fuel and gas oil by the R.O.P. have increased slightly, but the Soviets have to face the likelihood that attempts to increase their sales through price cutting would endanger their entire business and trading status in Great Britain, due to the Government having given six months' notice of termination of the general trade agreement.

The attitude of the major international oil group toward the Russians may be inferred from the fact that their delegates were not invited to attend the Paris conference, although they held themselves available for a call. This does not mean necessarily that they will be barred from future deliberations. There has been some discussion of a conference to be held in Europe early in 1933. If such a meeting takes place there is at least a possibility that Soviet representatives may attend. It is probable, however, that they will not be asked in unless some assurance is forthcoming of their readiness to accept a limitation of their export business. The terms of any cooperative arrangement that may be made to include the Soviet oil industry are not likely to be as favorable as those offered last summer to its representatives in New York.

As Russia exported over 40,000,000 bbl. in 1931, and more than 26,000,000 bbl. during the first eight months of 1932, she

must be recognized as a formidable competitor in international markets. The Soviet oil combine undoubtedly will be able to find purchasers for a large quantity of its output over a wide area. Low tanker charter rates today favor its operations. But the importance to Russia of the British market, which took 7,513,000 bbl. of Soviet oil in 1931, is such that she can hardly face a heavy decline there with equanimity. For many reasons Great Britain is a desirable and convenient market for Russia.

The present trend of trade suggests that the British market will not have proved to be Russia's greatest during the twelve months just past. Official records for the first nine months of 1932 show that apart from the decline in general consumption, the effect of the reduction in purchases by the group of major interests is very considerable. These figures are shown in the accompanying table.

Kerosene imports from Russia into Great Britain for the third quarter of the past year, which are incorporated in the accompanying figures, show a decrease from 489,886 bbl. in 1931 to 148,780 bbl. in 1932, a drop of 69.6 percent.

Read in conjunction with the recent closing down of the Medway Oil and Storage Company's cracking plant on the Isle of Grain, which followed the termination of the group's Russian kerosene contract last April, this reduction has a very definite significance. The Medway refinery was used for cracking Russian kerosene and the product obtained was sold under the brand name POWER. Its operations were part of an arrangement whereby the three major international companies distributing in Great Britain absorbed a large proportion of Russian exports to this country. This gave the group a valuable medium for putting the brakes on possible Soviet price-cutting, or on too rapid expansion and entry into certain other markets, such as India and China.

A reasonable inference from the decline in kerosene shipments into Great Britain, during the third quarter of the year in particular, together with the closing of the Medway plant, is that the Soviets have been unable to find British purchasers for supplies to replace those that the powerful international group have discontinued. Furthermore, the prices received by the Soviets for this kerosene were said to be much higher than would have been justified by Gulf quotations prevailing at the time. If this is correct it means that the Soviet sales loss is heavier than appears from mere gallonage figures.

It is only necessary to review the lay-

Imports of Russian Oil Products into Great Britain—Nine Months Period, Jan. 1–Sept 30, 1931 and 1932

Product	1931 (Bbls.)	1932 (Bbls.)	Increase + or Decrease − percent
Motor Fuel	2,857,000	1,654,000	− 42.1
Kerosene	1,569,000	920,000	− 41.3
Lubes	308,000	239,000	− 22.4
Gas oil	137,000	310,000	+ 126.3
Fuel oil	1,026,000	631,000	− 38.5
Total	5,897,000	3,754,000	− 36.3

out of Russia's distribution facilities in Great Britain to see the problem that the R.O.P. and the Soyouznefteexport have to face to avoid a further decline in their total sales now that they are deprived of the group's support. At the same time the Soviets can benefit from all general price increases, which will bring them a larger proportional income from what they do sell.

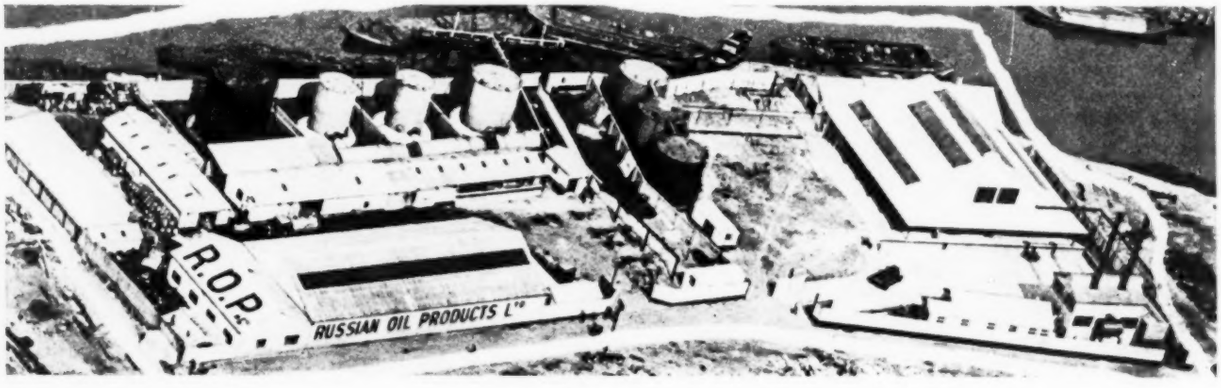
The international companies owe much of their success to the large capital expenditures undertaken in their distributing facilities, refineries and bulk storage at strategic points, ample transport equipment and adequate facilities for curb and service stations, as well as efficient sales organizations for handling bulk contracts. Much of the cost of such facilities was written off when competition was less keen and when products produced worthwhile profits.

One probable reason for the Soviet organization not being able to develop on the same scale is the absence of equal sums of ready money or credit. Consequently its facilities are not as complete as those of its major competitors. As a matter of fact the R.O.P. has been handling only about 40 percent of the total imports of Russian oils.

Deficiencies in marketing facilities and lack of sustained advertising of its products leaves the Soviet's import position in the United Kingdom vitally exposed to changes in the attitude of important buyers. It is, perhaps, unfortunate for Russia that she is losing sales just when the British market has been placed on a more remunerative basis, and at a time when the so-called combine would be more justified in paying the prices incorporated in the Medway and other contracts.

Against the loss of some of the business in Great Britain, Russia may be able to set gains in other markets as a result of the Soyouznefteexport's recent activities, but this is going to be difficult to achieve without severe price cutting, or other arrangements less favorable than they were enjoying with such group contracts as they formerly held. As such competition would be bound to cause disturbance in the international market, and tend to make conditions less comfortable for all distributors, it would not enhance the chances of the Russians being invited again to join in harmonious operating relations with the rest of the oil world. It is doubtful if Russia really wants to continue carrying along alone. Her oil staff is formed of shrewd business men and no doubt they would have found a satisfactory solution of the problems before them had their hands been entirely free and not subject to control from powers outside the petroleum industry.

Russian Oil Products' distributing depot in England.



Would Guard Rise in U. S. Motor Fuel Stocks

Conservative Refiners Seek to Avoid Accentuation of Usual Seasonal Increase. Declining Consumption a Factor. Difficulties in Dealing with Petroleum Under Existing Industrial Conditions.

WHILE efforts are constantly being made by responsible oil companies, state officials and others concerned to keep crude oil production in the United States from too greatly exceeding the requirements of a somewhat slackened demand for petroleum products another problem to which attention is being directed, particularly by those connected with the larger refining organizations, is that of holding motor fuel stocks in line and preventing them from becoming a weakening factor in the market situation.

A rise in storage stocks of gasoline at this time of year is not in itself disturbing. It may be looked upon as seasonal, or at least usual. Demand for motor fuel regularly drops off with the arrival of the winter season and supplies ordinarily mount upward from December until April or May. During the summer months consumption outstrips production and stocks are reduced. In the past year there was a gradual decrease in stored gasoline from 67,000,000 bbl. at the end of May to a little over 48,000,000 bbl. in mid-November. The trend then turned upward and by December 3 stocks were back to 49,720,000 bbl. Reference to the accompanying graph indicates that a similar course has been followed during each of the past several years. Among conservative members of the industry the need for particular care in watching additions to storage is felt to be called for, however, by the fact that the average level of stocks has risen from season to season and was higher in 1932 than at any previous time.

Discussion of this subject with executives of many of the more important refining companies reveals that they are fully alive to the importance of keeping gasoline stocks within bounds. Practically all of these companies have reduced their operations drastically. In some cases they are running at not more than 50 to 60 percent of capacity. Some of the smaller concerns operating single plants are still working at 80 percent or more. The canvass of opinion shows, moreover, that there are serious practical difficulties in the way of further extensive reductions at this time on the part of those who already are far below their potential output.

In the operation of a refinery there are decided advantages in maintaining a fairly uniform volume of throughput. Drastic cutting down of operations results in increasing costs. For refineries in certain locations, such as those along the Gulf Coast and in the Southwestern states, operating conditions in the winter months are rather more favorable than in the summer. A company maintaining a considerable tanker fleet finds it preferable to keep its flow of products moving at a fairly steady rate. For all of these reasons it is convenient and desirable to allow gasoline to accumulate at bulk storage points during the season of slack demand and to draw down these stocks in periods of heavy consumption. So long as total stocks fluctuate in accord with seasonal variations in demand there can be little criticism of this practice. With a lessening consumer demand anticipated for the next several months, however, there is a possibility that total stocks may reach unwieldy levels during the coming year while imposing an added burden upon the companies carrying them.

While some increase in stocks in the season of light consumption is logical and indeed inevitable, a rise of over 1,000,000 bbl. in a single week, such as took place at the end of December, gives food for thought, particularly in view of the continued falling off in the number of motors in operation and the general agreement that existing supplies of gasoline are unnecessarily large. Continuation of production at a rate so far in excess of demand as this would mean an addition to visible supplies of more than 12,000,000 bbl. before the time when an increase in consumption may be expected to make itself felt. The expansion contemplated by the statistical committee of the American Petroleum Institute for the six months ending March 31, 1933, is only 6,200,000 bbl., and even this quantity, it is admitted, is not needed.

How to effect a diminution in refined stocks has been one of the troublesome questions with which the American petroleum industry has had to contend for the past three years. The existence of excessive stores of gasoline is a legacy from the period of record production in 1929 when refiners, in order to take care of the heavy crude output of that year, built up their stocks of motor fuel to a level much higher than had prevailed previously. From the end of 1928 to the close of 1929 gasoline in storage increased from 33,000,000 bbl. to more than 43,000,000 bbl. and while there have been wide fluctuations since that time the total figure never has been reduced to the earlier level. While crude production has fallen 20 percent in the past two years and stocks of crude have decreased 17 percent stored gasoline at the end of 1932 is greater in quantity than at the close of any previous year, though not larger than it has been on some intervening dates.

The wide difference between the regulation of crude production and the regulation of refining is that in the case of the former there is a recognized authority capable of exercising control while in the latter any restriction introduced must depend upon the voluntary action of individual producers. State governments may enact laws under which the total output of all wells within the state or that of individual wells may be legally fixed. Once the oil is brought above ground, however, it cannot be confined within the territorial boundaries of the state in which it has been produced and of course the state's authority does not extend beyond these limits. The refiners cannot come together and agree upon the quantities which each will put through his plant because such action is in contravention of the anti-trust laws of the country. While it can be shown that it is to the disadvantage of the industry as a whole and of the refiner individually to produce more gasoline than can be marketed within a reasonable time there are certain to be, as in all cases where voluntary control is attempted, a certain number of individuals who will refuse to play the game and will seek to advance their own selfish interests

by producing to full capacity. This excess outturn, if maintained over a considerable period, may easily become a serious threat to market stability.

Another aspect of the case is that steel storage is expensive. While the cost of carrying a barrel of gasoline varies somewhat according to local conditions the average expense per bbl. probably ranges from 15 to 25 cents a year. If a company accumulates supplies which must be carried over from season to season it is adding materially and unnecessarily to its expenses. It cannot be gainsaid that underground storage of oil is the most economical and the least disturbing form. If crude production can be held substantially to current market requirements the refining problem may be counted upon to take care of itself. Until this desirable condition is established, however, the accumulation of excessive refined stocks must be regarded as burdensome to the companies carrying them and unsettling to the general marketing situation.

Assuming that the refiner is sincerely desirous of doing his part to prevent the increase of refined stocks and to reduce the size of those outstanding, what course is he to follow? The one principle that has been proved to be workable in dealing with matters of this kind is that of "as is". Under this principle each producing unit is allowed to retain its former share of the market; if a reduction is called for each will reduce proportionately so that its relative position is undisturbed. In the case of American refiners a guide post to necessary action is provided by the forecasts of probable demand prepared by the Volunteer Committee on Petroleum Economics of the Federal Oil Conservation Board and the Committee on Refinery Statistics and Economics of the American Petroleum Institute. These reports, though independently prepared, are usually in reasonably close agreement and in the past have proved to be rather accurate.

The estimate of the first named of these committees is that the probable quantity of gasoline needed to supply United States consumers for the period from January 1 to March 31, 1933, will be 82,100,000 bbl. or 912,000 bbl. daily. The statistical committee of the American Petroleum Institute places the probable demand at a slightly lower figure, 80,800,000 bbl. or 897,000 bbl. daily. The A. P. I. committee specifically recommended that from October 1, 1932 to March 31, 1933, crude runs to stills be reduced 100,000 bbl. daily. This, however, provides for no decrease in stocks and in fact contemplates an increase of more than 6,000,000 bbl. by the end of the period specified. As production during the past two months has been running at the rate of over 1,200,000 bbl. daily it would seem that this should be lowered to 900,000 bbl. in order to prevent an undue expansion of stocks during the first quarter of 1933. It is not difficult for the conscientious refiner to calculate how much of a cutting down in his own operations is necessary in order to conform to the needs of this reduction.

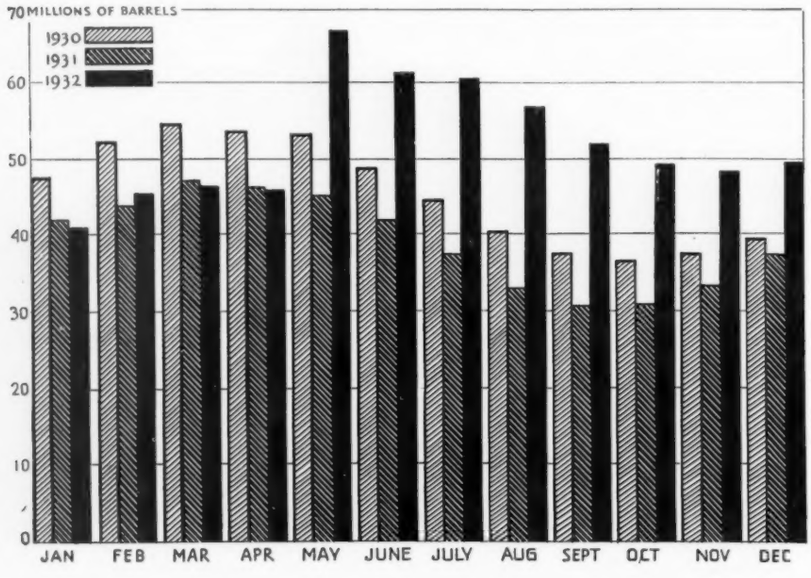
Even the sharp reduction in refinery output indicated by the above figures does not solve the problem of unduly high stocks for it would place motor fuel supplies at the end of the first quarter of 1933 at a higher figure than they ever before have reached at that time of year. To bring such stocks down to the basis of one month's requirements, which undoubtedly would be sufficient to safeguard the trade situation, would necessitate a reduction in daily runs to stills of roundly 200,000 bbl. daily more than was suggested in the recent report of the statisticians of the American Petroleum Institute. This is a stiff order and probably is impracticable of realization under existing conditions. On the other hand there is a strong possibility that the falling off in demand for motor fuel may become more accentuated during the next few months and in that case a further curtailment of refining activities will be the only means of keep ing stocks from rising to seriously embarrassing heights.

There is still room for argument as to whether it is preferable, if excess stocks must continue to be carried, to maintain these in the form of crude or of refined products. Undoubtedly, when the large refining organizations expanded their stocks in 1929, they felt that they were rendering a service to the industry by holding these in such a way that would not upset the market. Unquestionably too they did not expect that it would be necessary to sustain this surplus indefinitely. Refining bears a certain customary relation to crude production. If there is an excess of production and crude begins to accumulate it exerts a pressure to find outlets. If the plants to which it normally would be run are unwilling to take it others will be found that will accept it and will find markets for it, openly or surreptitiously. Reduction of throughput by those refineries which may be classed as regular or ethical has a tendency to encourage the operation of "bootleg" establishments that endanger the maintenance of a reasonable price structure.

Another practical consideration that tends to keep refinery operations at the present time at a higher point than might otherwise be the case is the desire of the refiners to avoid contributing to the increase of unemployment. Cutting down operations involves laying off men. To a certain extent the adoption of the share-the-work plan by which employes are put on a five day week offsets this, but this procedure obviously has its limitations. Discussions with the heads of refining organizations reveal that in certain instances they are running more crude to stills than their judgment dictates as necessary because of a very commendable desire to protect their workmen and the workmen's families.

Refiners cannot meet together and agree to limit throughput to a fixed ratio to capacity. By so doing they would expose themselves to prosecution under the anti-trust laws of the country. State control of refining applied in the same manner as is the regulation of production is not feasible because oil once produced cannot be prevented from moving beyond the jurisdiction of a particular state. The matter must be left to the conscience and judgment of individual refiners. While they undoubtedly will consult their own best interests by refraining from adding to storage stocks and by acting to reduce these stocks somewhat it is not to be denied that there are many difficulties in the way and that the refiner who acts to serve the best interests of the industry may thereby expose himself to added competition by others who are less considerate.

Comparison of U. S. motor fuel stocks at end of each month, 1930 to 1932



Trinidad—Chief Source of Empire Crude

High Quality of Island's Products Wins Place of Growing Importance in British Market. Strategic Location for Bunkering. Refinery Equipment Improved.

TRINIDAD is a comparatively small island in the Caribbean Sea. It has, however, the largest accessible oilfields known in the whole of an Empire covering almost one-fourth of the earth's surface. Of the oil known to exist in the British Empire, comparatively little can now be economically developed, and therefore large quantities are obtained from foreign sources to meet its annual consumption of 140,000,000 bbl. It is therefore of interest to examine the chief oil producing section of the Empire, Trinidad, with regard to its present position, and possible future development.

Trinidad oil production has increased steadily from 225,000 bbl. in 1910 to 9,745,000 bbl. in 1931. The requirements of the island are small, and indeed, the total oil requirements of all the islands of the British West Indies, which are supplied mainly from this source are only about 2,500,000 bbl., including bunkering, leaving a surplus of 7,245,000 bbl. for export, an amount which is a conveniently placed national stock.

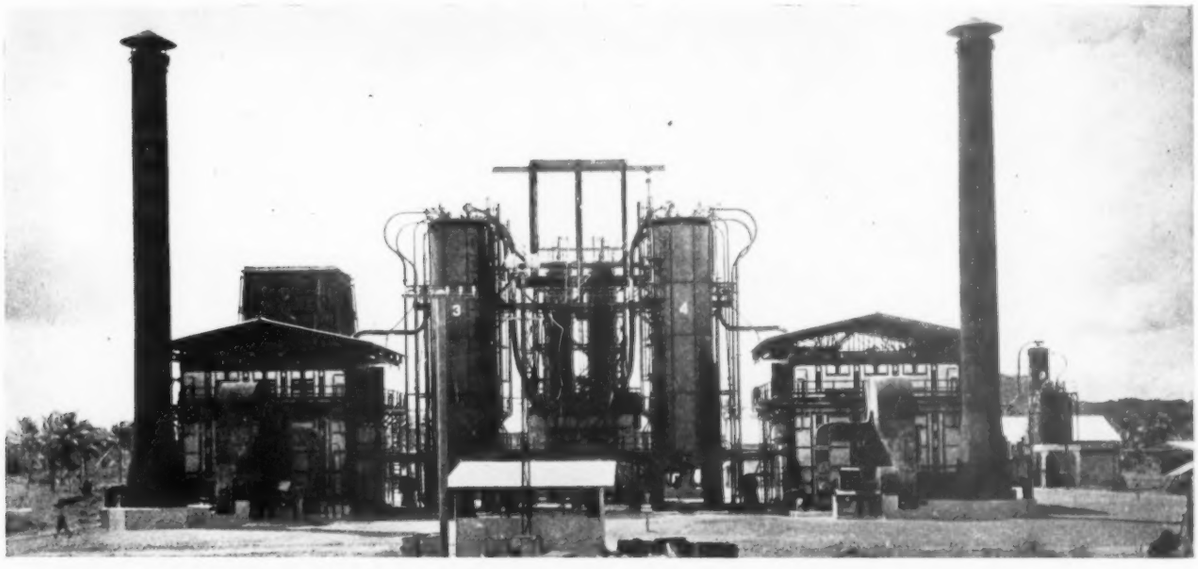
Up to the present the oil production from Trinidad has practically all been obtained from a narrow belt in the southern part of the island. The producing sands are very complicated, due partly to their lenticular formation, and drilling operations are difficult owing to high gas pressure.

When world commerce was in its infancy, Britain developed throughout the world areas of great strategic value for the commerce that she foresaw in years to come. Trinidad, a colony won in 1797, has proved to be such a key position. Situated in the southern part of the Caribbean Sea, it is a convenient port of call for Atlantic shipping between North and South America, and also for American or European shipping through the Panama Canal. The value of having a large supply of fuel oil so situated on these major shipping routes in an age when oil is essential can hardly be overestimated. The value of such a supply for the British Navy is an important national consideration.

Hollow forging for Trinidad Leaseholds under construction by Firth and Brown, Ltd., Sheffield, England.

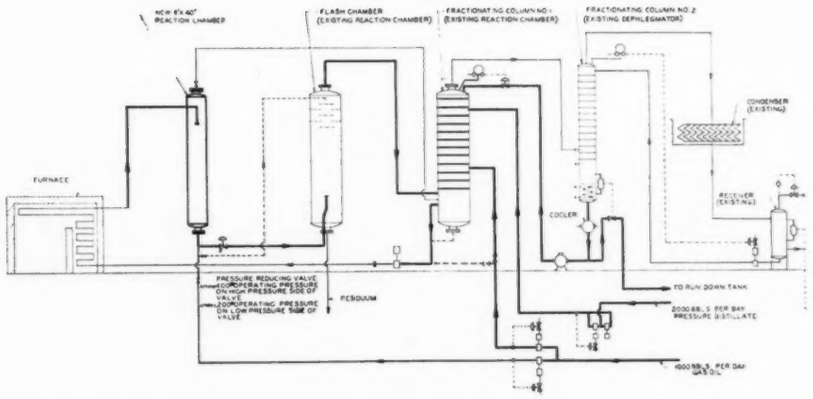
It might be expected that oil operations in a tropical country would be subject to the usual hardships of living in the tropics. In the early developments the oil workers in Trinidad were faced with such problems, but the general development of the island and of the oilfields by the major companies has now made living conditions extremely satisfactory. Rainfall in Trinidad is about 70 in. per year, mainly occurring in the months from May to November. This rainfall, which for the oilfields is the major supply of water, is carefully conserved for plant and domestic use in large reservoirs, such as those constructed by Trinidad Leaseholds Ltd. at Pointe-à-Pierre, where provision is made for a supply of 122,000,000 gal.

General view of the modern Dubbs cracking plant of the Trinidad Leaseholds Company.



The value of Trinidad's annual exports is £4,170,000, in which oil, sugar and cocoa represent approximately 46 percent, 22 percent and 19 percent respectively of the total. The oil industry gives employment to several thousand people.

Oilfields of Trinidad are operated by both English and American companies, and approximately 85 percent of the production is refined locally. The largest refinery is that of Trinidad Leaseholds Limited, situated at Pointe-à-Pierre, which has a capacity of about 30,000 bbl. per day. Trinidad Leaseholds Limited began operations in 1913. The early marketing developments of the company were to supply the immediate requirements of the British Navy and the local markets. Excess of products was later marketed mainly on the American Atlantic Seaboard, which is the closest large consuming area, and was sold in that market at a premium price, owing to the exceptionally high anti-knock value of the motor fuel. The agitation in the United States against free importation of products from foreign sources resulted in an import duty of 2½ cents per gallon being placed on light distillates in 1932. This move had been anticipated by Trinidad Leaseholds Ltd. and, in 1930, the company began petrol distribution in England on a small scale. With the imposition of the American tax more of the Trinidad production was diverted to England, where an active marketing campaign was begun, without, however, any preference being given in spite of the fact that Trinidad is British territory. The campaign, however, has been very successful, and Trinidad products, marketed under the name of Regent, now represent a considerable part of the market in the South of England. Three grades of petrol are sold, Regent Super, the first grade, in addition to having the usual properties, has an octane number of about 74. Regent is the commercial grade, and this petrol, although slightly less volatile, has an octane number well over 70. A third product, Regent Benzole Mixture, is a blend of light distillate with British Benzole, as in England there are still a considerable number of motorists who desire a Benzole blend. The high natural anti-knock value permits these products to be sold direct without the addition of any anti-knock compounds. The company market their petrols independent of the combine, and thus have against them the effect of the exclusive buyers' rebate varying from a small percentage to 60 percent of the dealer's profits. Nevertheless, the Regent pumps are increasing at a rapid rate, the public buying these products at the same price as the corresponding combine grade.



Modified hook-up of the Dubbs installation in the Trinidad Leasholds Refinery.

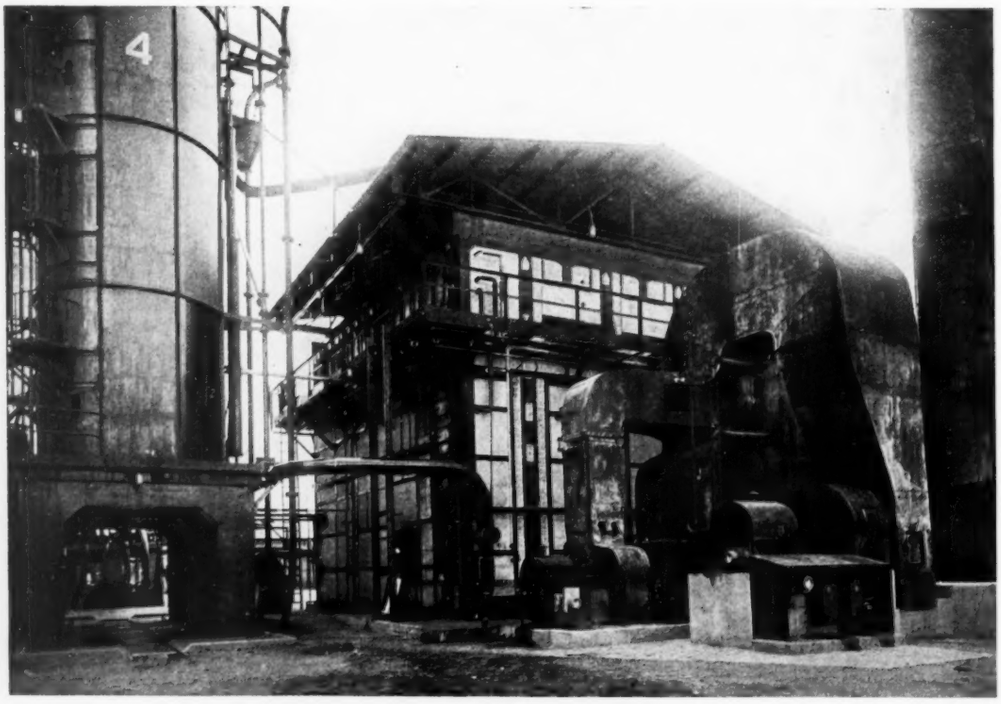
The heavier oils produced are sold in the world markets, a large part being employed as bunkers at various ports in the West Indies.

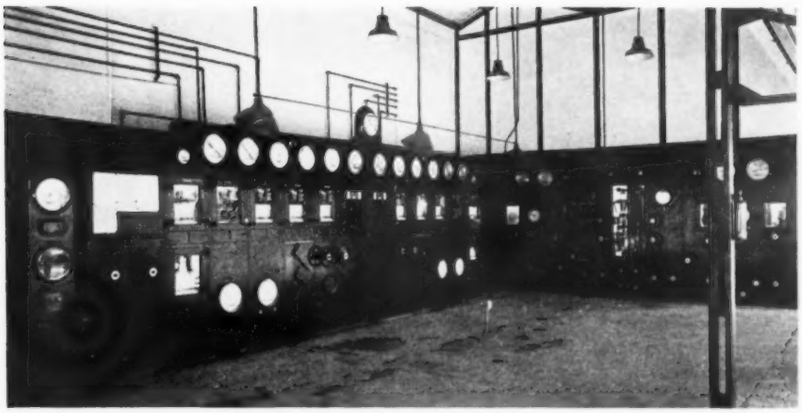
The manufacturing operations of Trinidad Leaseholds Ltd. are centered in its refinery at Pointe-à-Pierre which has been gradually enlarged from a topping plant to a complete and up-to-date refinery by the continued addition of improved processes and equipment. During the past year the plant handled approximately 6,300,000 bbl. of crude.

Crude oil is pumped to the refinery through approximately 17 miles of 10 in. pipeline, from the company's field at Forest Reserve, to which the production from Apex (Trinidad) Oilfields Ltd. is also pumped. Centrifugal pumps are used for this service.

Up to some six years ago the refining plant consisted of a topping unit composed of a number of small spiral pipe stills, a battery of steam stills for re-run, and plant built originally as a cracking unit and later converted to a topping unit. In 1926 construction of the first pair of Dubbs units was begun. These units handled some 1,500 bbl. a day each, and worked at a pressure of 175 lbs. per square inch. In 1928 a new topping unit was installed, and in 1929 a similar unit of somewhat larger capacity was added. These two units are both of Foster Wheeler design, and are capable of producing three side streams in addition to fuel oil bottoms and gasoline overhead. In 1930, two new Dubbs units were built,

Hot exaust air, instead of escaping up the stack at right of picture is run back and used in preheating.





Accurate control of the refinery at Pointe-à-Pierre is centered in this elaborate board.

each capable of cracking between 3,000 and 4,000 bbl. of fuel oil per day. These units operate under a pressure of 200 lbs. per square inch, and are each equipped with two 10 ft. diameter by 40 ft. long reaction chambers. At the present time one unit is being modified so that it can crack distillates and pressure distillate bottoms under a pressure of 400 lbs. per square inch. For this purpose the hook-up is being changed so as to include a reaction chamber 40 ft. long by 6 ft. internal diameter, which will work under the full 400 lbs. per square inch, the pressure being reduced before the vapors enter the second reaction chamber to 200 lbs. per square inch. The new reaction chamber is a solid forging made from a single ingot by a British manufacturer and is believed to be the world's largest hollow forging. On completion of these modifications this unit will crack the whole of the pressure distillate bottoms from the other new unit, which will then produce an end-point distillate. This change has been rendered necessary owing to the deficiency in early boiling fractions of Trinidad crude.

Pressure distillate from the Dubbs plant is given a preliminary wash with caustic soda and is then treated in a continuous treater with sulphuric acid and caustic soda. The method of rerunning pressure distillates is unusual, in that it is returned to the towers of the topping units as reflux. Gasoline from the topping units, consisting of a mixture of straight run and cracked, is given a doctor treat.

Spent acid from the pressure distillate treating plant is recovered as far as possible, being diluted in a pressure separator, in which the organic matter is separated out, and the dilute acid concentrated in a Kestner evaporator up to 55 deg. Bé, made up to 60 deg. by addition of oleum.

The kerosene fraction from the topping units is treated in an Edeleanu plant, the extract being returned to the topping units. Vapors from storage tanks and topping plants, and gas from the cracking plants, are passed through a Braun absorption plant and stabilizer.

Shipments in bulk are made by way of a pipeline viaduct approximately 1⅓ miles long to a point where vessels drawing up to 34 ft. can always be accommodated. Storage capacity is approximately 500,000 bbl. of white oils and 1,700,000 bbl. of black oils.

Future outlook for Trinidad Leaseholds Ltd. and other companies operating in Trinidad is rather better than the outlook for many companies operating in other parts of the world. In spite of the loss of the American market through the application of a tax on imports, the sales of this particular company have held up because of their active development of the British market for Regent motor fuel.

The accompanying list of manufacturers furnished equipment for Trinidad Leaseholds.

Manufacturers Supplying Equipment to Trinidad

Mather and Platt, Ltd.	Pumps and Motors
Mechans, Ltd.	Storage Tanks, etc.
Motherwell Bridge and Engineering Co. Ltd.	Storage Tanks, etc.
Babcock and Wilcox, Ltd.	Boilers
Metropolitan Vickers Electrical Co. Ltd.	Electrical control gear
G. M. Marchant, Ltd.	Valves
Hopkinson's, Ltd.	Valves
Thos. Firth and John Brown, Ltd.	Forged reaction chamber
General Electric Co. Ltd.	Turbo generators
Wm. Bain and Co. Ltd.	Steel framed buildings
Bells Asbestos and Engineering Supplies, Ltd.	Asbestos sheeting
Stewarts and Lloyds, Ltd.	Piping
Cambridge Instrument Co.	Instruments and controls
Quasi-arc Co. Ltd.	Electric welding plant and electrodes
Universal Oil Products Co.	Dubbs process
Leyland Motors, Ltd.	Tank lorries for distributing operations
John I. Thornycroft and Co.	Tank lorries
Hammond Pump Works	Petrol Pumps for marketing operations
Foster Wheeler	Topping Units
Steel Barrel Company	Tanks for Tank lorries
Oxley Engineering Co.	Welded Storage Tanks
Belships, Ltd.	Shipping "Reaction Chamber"
A. O. Smith Corp.	Tube Stills
Crane Company	Valves and Piping
Ingersoll Rand Co.	Centrifugal Pumps
C. F. Braun and Co.	Stabilizers and Absorption Plant
Foxboro Co.	Instruments and Controls
Leeds and Northrup	Instruments and Controls
Taylor Instrument Co.	Instruments and Controls
Petroleum Ironworks Co.	Storage Tanks

The world's largest hollow forging being loaded for shipment to Trinidad.

Making Acid Treatment a Continuous Process

Acid Treatment of Oils Simplified by the Use of De Laval S-N Acid Sludge Separator Said to Produce More Satisfactory Results at Less Expense Due to Simpler Auxiliary Machinery.

ONE stumbling block in the way of making petroleum refining a continuous process has been overcome by the use of the centrifugal separators described in the accompanying article, which because of their simplicity have reduced the cost of the acid treatment phase of refining. The process described herewith eliminates the large settling tanks and the consequent difficulties encountered in obtaining an effective mixture of acid with petroleum in vessels of such size. The accompanying article is part of a paper delivered before the Institution of Petroleum Technologists in London, on December 15. The other part of this paper dealt with dewaxing oils by the S-N Tri Process as described in the December issue of World Petroleum and which is now in use in the Bordeaux plant of the Refineries de Petrole de la Gironde.

IN REGARD to the acid treatment of petroleum products it should be noted that in spite of the remarkable progress achieved during recent years in the refining branch of the petroleum industry this process has not yet reached an entirely satisfactory stage.

While it has been possible to make processes like distillation, dewaxing and cracking continuous, acid treatment remains in the ancient discontinuous stage and, consequently, still suffers from all the disadvantages thereof.

Procedure of acid treatment being sufficiently known, it is necessary to give only a brief survey of those points which would render modernization particularly desirable.

Construction of present equipment for acid treatment is governed by the fact that separation is effected by gravity settling only. This phase of the process can last for from 24 hours to several days. Continuous operation is, therefore, not possible and the refiner is compelled to choose for the whole procedure correspondingly large vessels. This has directly and indirectly several disadvantages.

It is first of all very difficult to provide for sufficiently effective mixing, as the use of efficient mechanical mixers for such huge quantities offers mechanical difficulties. Refiners, therefore, have chosen the method of air blowing which, superficially viewed, represents a simple solution. As a matter of fact, however, the degree of mixing is bad and the method involves new disadvantages.

First of all, the humidity of the air has a diluting effect on the sulphuric acid, and secondly, the oxygen present in the air has an oxidizing effect of its own on the oil. It may be that this process of oxidation is favored by the acid sludge formed during treating. Both these troubles become more and more serious with increasing temperature, as is well known to every refiner.

It is easy to understand that with great quantities to be treated an even distribution of the acid in the oil cannot be instantaneously effected, even with intensive mixing. The mixing period with compressed air must, therefore, be extended; which in turn increases the detrimental influence of the air.

The intimate contact of acid and oil results in the formation of acid sludge. When working in conventional agitators the acid immediately after having been added has not yet reached the required degree of dispersion and is to a great extent occluded in the tar which is formed immediately after the contact of some acid with the oil. Part of the acid is thus being excluded from the treating process. The air mixing must be continued for some time in order to disintegrate the tar formed and to make at least a part of the occluded acid effective for the reaction. The reactivity of this acid has in the meantime suffered a dilution with moisture from the air.

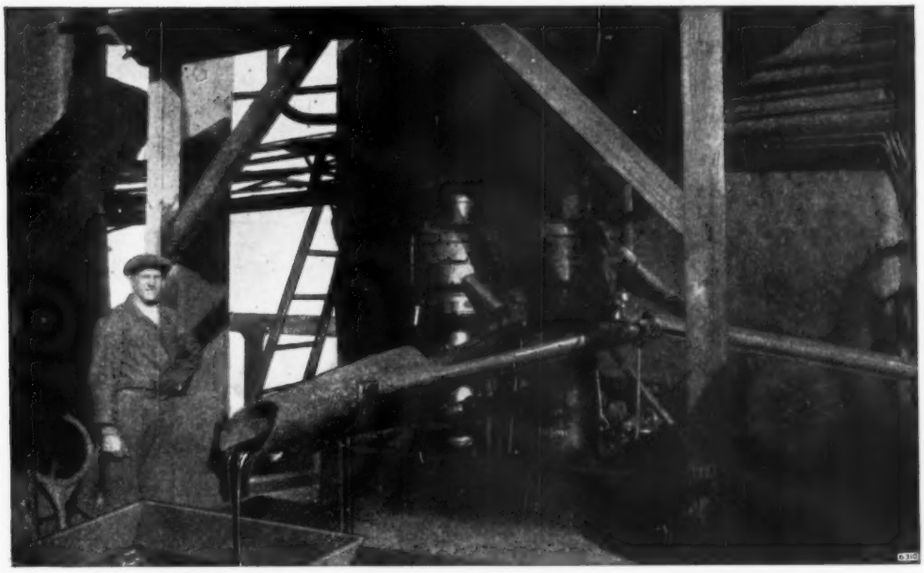
In all tars withdrawn after settling, an important quantity of free acid could always be detected. This acid has consequently been lost for the treating process. Dr. Kronasser has proved by microscopical and analytical investigations that acid sludge formed after effective mechanical mixing always contains much less free acid than the tar or sludge formed during the batch process with air mixing.

The slow settling of the sludge is a further serious disadvantage, since the treated oil is all the time in contact with the finely divided acid sludge. With most oils it seems as if part of the colored components of the sludge would go into solution in the oil. In any case an oil from which the acid sludge has been quickly removed always shows a better color than if the sludge has settled out slowly. A rapid and complete separation of oil and sludge is not possible when working with conventional agitators.

Investigations have shown that from a settled machine oil, ready for neutralization, 0.6 percent of tar could be separated by use of a centrifugal separator. For cylinder oils the corresponding figure was around 2.5 percent. It is interesting to note that in practice these figures have proved to be more or less constant. Even after further washing of the oil, acid sludge particles always remain therein.

The acidity gives a good indication of the purity of a settled oil. Properly settled oils show a low acidity which is always much higher, however, than in the case of centrifuged oils.

A high acidity renders the neutralization more difficult, since on one hand a greater amount of chemical is necessary, and on the other hand emulsification is



Centrifugal acid sludge separator in action

possible. In both cases the refiner has to count on higher oil losses. Finally, when drawing off the acid sludge from the bottom of the settling tank or agitator, some oil is unavoidably carried away. This fact too is responsible for losses.

It was a logical move to introduce centrifugal force to replace the gravity settling and thus to overcome all the above mentioned troubles. Experiments in this direction were carried on at an early date but without any success at that time. Only after the advance of centrifugal separator technique and the research work of the Separator-Nobel Company during the last five years was it possible to develop equipment which effects a continuous, instantaneous separation of the mixture into tar-free oil and oil-free tar. This apparatus is the De Laval S-N Acid Sludge Separator.

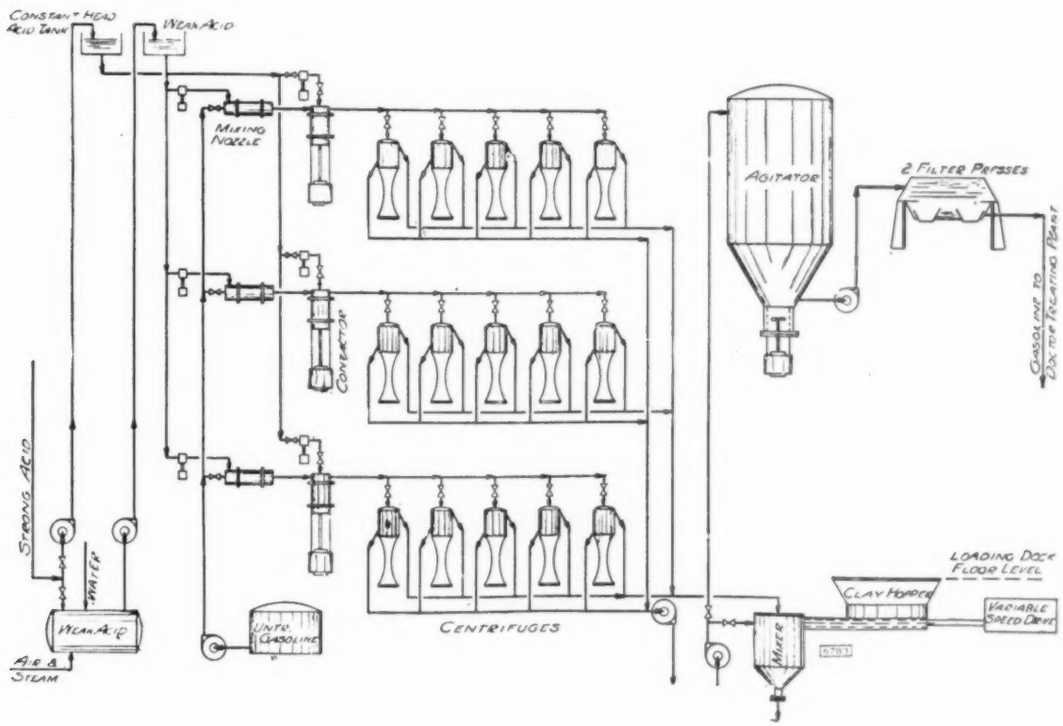
With this separator there is no longer any reason for adding the acid to a large volume of oil and then trying to disperse it by mixing. Instead, exactly proportioned quantities of oil and acid are now continuously fed into a highly efficient mechanical mixer at a rate corresponding to the suitable throughput of the separator. The intimate mixture of oil and acid is then passed into a reaction vessel where it remains for an appropriate time (from a few minutes up to one hour, depending on the oil) before being fed to the separator. Using the following basic principles the continuous S-N refining process was developed:

1. Maximum utilization of added sulphuric acid by equal distribution in the oil;
2. Exclusion of air during the whole procedure of acid treatment;
3. Shortest possible contact time between oil and acid sludge;
4. An oil free from sludge particles and a sludge free from oil being obtained.

The first of these principles is accomplished by introducing proportioned quantities of oil and acid into a highly efficient mixing apparatus, the reaction mixture leaving this apparatus a few seconds later. This mixture then goes to a closed reaction vessel, which is of such dimensions as to allow the mixture to remain there as long as necessary for the optimum reaction. This procedure also assures the exclusion of air.

The third and the fourth requirements

Flow chart of the 10,000 bbl. De Laval S-N treating plant at Bordeaux, France.



are simultaneously fulfilled by means of the De Laval S-N Separator. The mixture coming from the reaction vessel is at once completely separated into acid sludge and oil, thus definitely excluding the objectionable influence of sludge on treated oil.

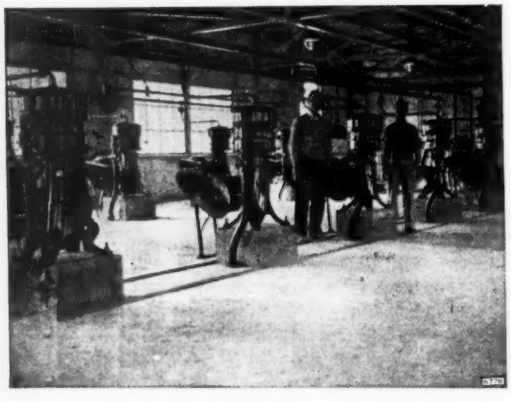
In this operation three liquids of different specific weight must be continuously separated and discharged from the separator. As previously stated the sludge always contains varying quantities of sulphuric acid. Due to the great centrifugal force generated in the separator bowl, acid is liberated from the sludge. Since standard separators are designed to discharge continuously only two components, they cannot be used for our purpose. Only after the continuous discharge of the third component was made possible one could speak of a continuous acid treating process with the aid of centrifugal separators.

In the case of the De Laval S-N acid sludge separator this was achieved by the introduction of a "viscosity capillary." Aided by this capillary the continuous separation takes place as follows: the free acid, as the heaviest component, is withdrawn from the periphery of the bowl through the above-mentioned capillary and the other two components, sludge and oil, are separated and discharged in the usual way.

The acid sludge, which in many cases is very viscous, passes through the bowl and is discharged without any trouble.

The experiments were first carried out using vertical mixers provided with an effective stirrer. These mixing vessels served at the same time as reaction vessels, their dimensions being chosen so as to give the desired reaction time. For oils which required a long reaction time the mixing vessel had to be very large and a great quantity of liquid had to be stirred. As this required too much power the mixer was separated from the reaction vessel.

Two batteries of five De Laval S-N Acid Sludge Separators



The resulting new method gave a far better mixing effect with considerably reduced power consumption. Centrifugal pumps proved to be highly efficient mixers. Oil and acid meet in the suction line of the overdimensioned pump, where the components are subjected to an intense mixing, only to be separated again after the reaction is completed.

It has been sufficiently proved in practice that, in view of the further treatment, the acid treated oil should be as clean as possible. No matter by which method the neutralization is carried out, the difference between settled oil and centrifuged oil is striking.

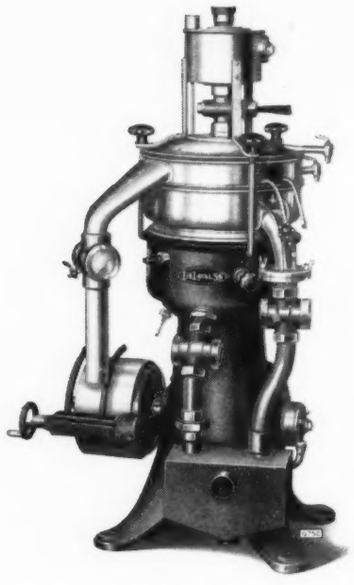
In the course of the caustic wash it was observed that the separation of caustic solution and oil takes place much more quickly with a centrifuged oil. Thus time and wash water are saved. Due to reduced washing, the losses of oil are also reduced. Moreover, the possibility of formation of emulsion is much smaller in the case of centrifuged oil. It could further be ascertained that the acidity of the acid treated and centrifuged oil is so low, that it is possible to treat it directly with Fuller's earth. Considerably less earth is required than in the case of settled oil, which naturally means a higher yield of finished oil.

Comparative Results of Continuous and Discontinuous Acid Treatment

	Percent used acid	Reaction time	Color (Union)
Spindle oil, 230 secs. R at 68° F.			
Discontinuous treatment..	3.0	6 hours	1.5–2
De Laval S-N cont. treatment	1.5	1.5 min.	1.5–2
Machine oil, 154 secs. R at 122°F.			
Discontinuous treatment..	2.4	24 hours	3.5
De Laval S-N cont. treatment	1.8	2 min.	2.0–2.5
Machine oil, 770 secs. R at 122 ° F.			
Discontinuous treatment..	2.6	26 hours	6.0
De Laval S-N cont. treatment	2.24	2 min.	4–4.5

Another advantage which should not be overlooked is the possibility of acid treating at higher temperatures without impairing the color of the finished oil. At increased temperature the sulphuric acid is much better utilized and a smaller amount is required.

Briefly summarized, with the apparatus described it is possible to achieve the following advantages: the exactly proportioned quantity of acid is instantaneously dispersed in the oil, and the reaction time is closely controlled by proper adjustment of the reaction vessel; the separation of oil, sludge and free acid take place instantaneously in the separator, oil-free sludge and sludge-free oil being obtained; the whole process is a continuous one and air is excluded; the process can easily be controlled in every phase and the desired temperatures be maintained.



De Laval S-N Acid Sludge Separator

Comparing the new process with the old one, the following advantages will at once be realized:

1. The quantity of acid not taking part in the reaction is reduced. Consequently, an economy in acid and a higher yield of finished oil is obtained.
2. The separation of oil and sludge is very sharp and the oil which is otherwise lost with the sludge is thus saved.
3. The pepper sludge remaining in a settled oil is removed by the separator together with the main portion of the sludge. This gives the oil a lower acidity and, consequently, involves a reduction of the consumption of neutralizing agent.
4. The smaller consumption of neutralizing agent reduces the oil losses.
5. The process being entirely mechanical and automatic is easily controllable.
6. The detrimental influence of too long a heating and reaction period is eliminated.
7. It is possible to work at higher temperatures.
8. The process plant requires only little space, which means economy due to the elimination of huge agitators.

It is not possible to give in advance detailed directions for the treatment of individual oils. By preliminary experiments, however, the best method can easily be determined.

Of De Laval S-N continuous acid refining tests recently carried out on a large scale, those made with Roumanian asphalt-base, vacuum pipe still distillates are of particular interest. The consumption of acid was considerably reduced and the efficient mechanical mixing allowed for a total reaction time of two to four minutes only. In the accompanying table a comparison between the old and the new method is given.

In a northern European refinery producing lubricating oils from distillates of South American crude by treatment in a De Laval S-N continuous refining plant it has been possible to reduce the acid consumption for spindle oils from 4 to 2 percent by weight. For machine oils, 406 secs. R at 122 deg. Fahr., the consumption of acid was reduced from 7 to 5 percent by weight. At the same time the yield of oil was increased from 92 to 94 percent.

Information from the same source also showed that the neutralization could be carried out much more quickly and easily and that a considerable reduction in the consumption of Fuller's earth was effected.

What has been said regarding the continuous treatment of lubricating oils holds true to a large extent in refining cracked gasoline. Demand for good anti-knock quality—so important at present—makes it imperative to keep the time of reaction within much narrower limits, just as is the case with lubricating oil.

It is possible to obtain high octane numbers by treatment either at low temperature or at normal temperature and shortest possible reaction time. Investigations carried out in the United States with the De Laval S-N process showed that reaction times from only a few seconds up to 15 seconds were sufficient for a proper acid treatment of gasoline without any considerable reduction of the octane number. A De Laval S-N treated pressure distillate gives now, in commercial production, octane number 70, against only 50 with the old method. Gum tests of the present product and the product produced by the older method show the relation 5:9, i.e. a considerable improvement. This might be due to reduced formation of peroxides as a direct consequence of the shorter contact time.

By the short and closely controlled contact time not only the oxidation but also the polymerization is reduced to a minimum. Therefore, in many cases a redistillation can be omitted; but where necessary a higher yield of a lower end-point distillate will result.

Between gasoline and lubricating oil there is the wide field of kerosenes, and naturally the question comes up whether it is not possible to refine these products continuously. Investigations have been carried out but not yet completed on a commercial scale. The question is of the greatest interest and the results of preliminary experiments were such as to demand continuation of this work.

A kerosene treated in a refinery by addition of two subsequent portions of acid could, when continuously mixed and separated in efficient equipment, be treated by one portion only and still give a perfect product. The acid consumption could be reduced by 17–22 percent. The kerosene was entirely odorless and the color (Stammer) was improved from 200 to 300.

The optimum reaction time for that particular kerosene was 5 minutes, with a tolerance of ±1 minute. More or less time gave inferior results.

The acidity of the centrifuged kerosene was very low which enabled the neutralization to be carried out without preliminary water washing.

The continuous method was employed also for the neutralization. Even after very intensive mixing with 2 percent of a 6 Bé soda solution a complete separation of the two components could easily be effected in the De Laval S-N centrifuge, and afterwards one waterwash only with intense mixing and separation gave a natural, finished product.

The main importance of the process, however, is to be found in the field of lubricating oil refining, where it is destined to effect a revolutionary economy in production costs.

▼

LIBRARY

BACK TO THE COAL STANDARD by Captain Bernard Acworth, D.S.O., R.N. It appears that Captain Bernard Acworth, like so many other naval officers serving in submarines, has developed a deep-seated grudge against the internal combustion engine. As a rule the earlier the submarine, the deeper the grudge. There is something about dodging along awash in a cranky vessel as roomy as the inside of a watch and reeking like an omnibus terminal which takes all the romance out of the sea.

Thus sorely tried the average sailor vents his spleen vocally on the spot in accordance with the best traditions of the sea. Not so with Captain Acworth. His wound is too deep or perhaps his love of color is too great. Having the soul of an artist he dramatizes the situation. In the whirling arms of the windmills Don Quixote saw the brandished weapons of the foe. Captain Acworth sees the flower of British knighthood ground beneath the flywheel of the internal combustion engine. Led by the doughty captain, the Knights of the Black Diamond ride to the rescue.

It is all very colorful, very thrilling and quite unconvincing. Who can sit straight-faced while the warring disorganized petroleum industry becomes the "Oil Ring" and while Sir John Cadman and Lord Bearsted stalk about in cloak and mask plunging their stilettos into Baron Coal's brave band?

Many tired exponents of cooperation in this industry would be delighted if they could discover Captain Acworth's Magic Oil Ring. His hypothesis that the internal combustion engine era is the deliberate creation of the oil kings borders on the ridiculous. The guilty man is Henry Ford who made the automobile cheap and accessible.

It would in fact be extremely difficult to find anyone connected with the oil business who is conspicuous for having encouraged the adoption of internal combustion engines. The Standard Oil Company kept on hauling motor fuel with horse-drawn tanks long after the automobile arrived. Diesel designed his engine to burn coal and even after oil proved the ideal fuel his invention knocked long and in vain at the doors of some of the biggest oil companies. In the face of the greatest surplus of oil ever known the leaders in the industry today are not seeking systematically for new markets and new uses. They are, particularly in Europe, cartel-minded. There is no saner and more far-sighted leader in the industry than Sir John Cadman, yet when he crossed the ocean the other day to address the American Petroleum Industry he had nothing to say about ways of selling more oil—the burden of his message was: let us all agree to export less.

Captain Acworth's battle against the internal combustion engine is well intentioned and brave but futile. As well try to solve unemployment by abolishing the telephone and resurrecting the old-fashioned messenger. The petroleum industry is probably a transient thing in the history of the world, a matter of three or four centuries at the most but the internal combustion engine and liquid fuel are here to stay. Like Captain Acworth we may deplore the changing face of the world but our duty is not to arrest progress but to prepare the way intelligently for its advance.

Modern Merchandising for Lubricating Oils

Several Companies Now Testing Use of Consumer Sized Containers. Packaging Held Essential to Complete the Work of Sales Promotion and Distribution.

TO PACKAGE or not to package is a very live question among the manufacturers and marketers of lubricating oils. Before the end of the year now beginning the problem undoubtedly will present itself for decision before the executives and marketing division heads of many oil companies. The article published herewith is frankly a statement of the case for the affirmative written by a man who not only knows the oil industry but who has given close study to merchandising problems in other lines.

FILLING a barrel by pouring in at the bunghole while allowing the contents to trickle away at the spigot is proverbially a wasteful and expensive procedure. Yet a number of oil company officials are beginning to harbor the suspicion that they have been doing this very thing in the marketing of certain of their products, and particularly in the sale of lubricating oils. Millions of dollars have been spent in building up the reputations of special brands of lubricant. So widespread has been the acceptance of this educational propaganda that eight out of ten motorists, when they drive up to a service station, ask for one of the advertised brands. Practically no driver answers, "Any old oil," when asked the direct question as to what kind he will have. Even though he may not have any real choice he will name some brand that has been made familiar to him through persistent advertising.

So far so good. It shows that the advertising displays have done their work, doesn't it? True enough, but here is the catch, the leak at the spigot: When the station attendant disappears into his storeroom and emerges with a quart or gallon measure containing a dark liquid, or when he seizes a bottle from a nearby rack and pours it into the vitals of the motor, who's oil is it—what assurance has the purchaser that his car is getting what he asked for rather than a dose of crankcase drainings mixed with a low grade lubricant on which the station operator can make an extra profit? The answer is, *none* except his confidence in the integrity of the salesman who perhaps is a stranger with whom he never before has dealt and whom he may never encounter again.

In the case of gasoline the situation is somewhat different. Whether sold by a company-owned station or by a country storekeeper who conducts a limited gas business as a side line for the convenience of his customers the name is there on the pump and this is *prima facie* evidence at least that the pump purveys what it promises. No oil company will permit a dealer to run another's product through its pumps and the company can readily discover and thwart such a practice. So well understood is this that when a motor car owner buys no-name gasoline he expects to receive an inferior product and accepts it only because he is getting it at a low price.

In purchasing lube oil at a company-owned service station one may be tolerably safe in assuming that he is getting an oil produced by that particular company. But by far the majority of retail outlets are not company-owned. Here the in-

Two of a series of Canfield's newspaper advertisements stressing consumer protection.

The usual type dispenser has been adapted by one can manufacturer to use with sealed packages; slight pressure cuts the can in nine places.

ducement to substitute an inferior product is increased by the ease with which the substitution can be made. Even where no reasonable ground for the suspicion of substitution may exist there is a certain satisfaction to the buyer in seeing his purchase delivered in an unbroken package prepared especially for his use and delivered intact as it left the refinery. This psychological benefit is worth real money to the company.

The oil industry has learned a lot about "bootlegging" of one kind and another in the past two or three years. As at present conducted, the lubricating oil business is an ideal field for the bootlegger and it is a safe bet that the use of crank case drainings and doctored distillate in lieu of honest lubricants will continue to grow unless modern methods of merchandising are adopted. In the United States the imposition within the past year of a heavy tax on lubricating oils is an added incentive to the unscrupulous dealer to stretch his oil supply by adulteration if he can do so with little fear of detection. The growth of lube oil racketeering inevitably will have at least three bad effects:

1—Legitimate dealers will lose volume to unscrupulous competitors in increasing amounts.

2—In self defense recognized brands will be forced to cut prices in an endeavor to meet pirating and retain their market.

3—The consumer who receives substituted oil will lose confidence and will condemn all lubes as unreliable.

The old-time marketer who still thinks in terms of a business era that is fast disappearing will answer to all this that oil is oil and merely putting it into a fancy package won't change its character. It is an old cry and one that has been raised whenever modern merchandising methods have forced their way into long established industries. It may be said even more truly that flour is flour and sugar is sugar. Yet modern millers have found it worth while to place their product in special containers which pass unbroken into the hands of the consumer and the great sugar refiners have discovered that the only way to hold their ground against a growing army of competitors is to use labeled bags and cartons which enable the purchaser to know that he is getting the product made familiar to him by extensive advertising.

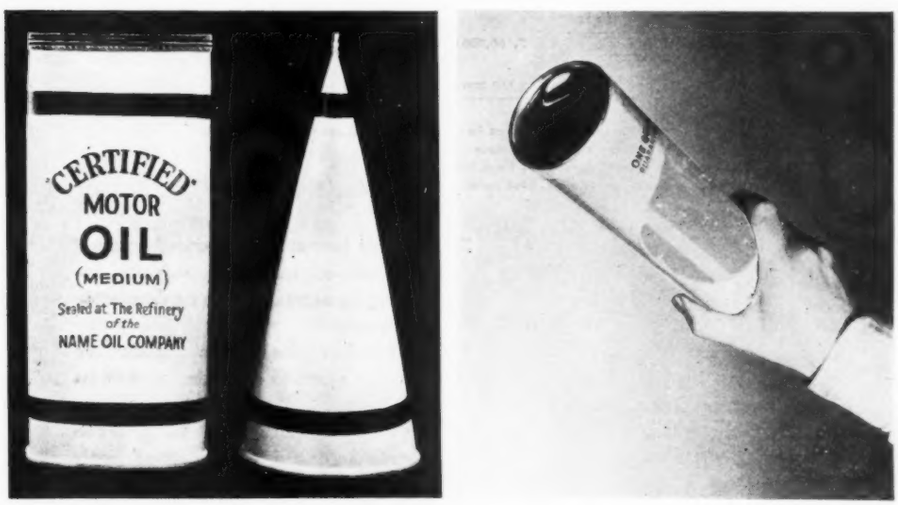
Three fundamental steps are recognised by marketing experts as essential to the establishment and maintenance of demand for a named product:

1—The consumer must be convinced that the product has sufficient merit to justify its regular use or at least a trial. This is the function of sales promotion in all its varied aspects.

2—The product must have a sufficiently wide distribution so that the would-be buyer can obtain it when he asks for it. To provide such distribution is the function of the sales department.

3—The consumer must be protected from substitution and must have a guarantee that he is actually receiving the product he has asked for. This is the function of the trade-marked brand or distinctive container.

To fulfil only the first two of these requirements without the third is to do only part of the job and to reap only part



Illustrating two of the several paper containers both of which are destroyed in opening

The tin container is conveniently punctured by steel knives within the dispenser by a slight pressure

of the potential reward from the time, money and effort expended in sales promotion and distribution.

Let us look at the matter from the manufacturer's point of view. The manufacturer has certain outlets through which he can guarantee delivery of lube oil to the consumer. But that is not enough. He must underwrite his brand at every outlet. This applies particularly in the merchandising of a product which has no distinctive shape, color or marking which makes it readily distinguishable.

In every community there is a group of independent dealers who shift from one brand of gasoline to another as each company brings out a new product and advertises it freely. These scalpers do the same with lube oils; they trade on the consumer demand created by lube oil advertising and in many instances substitute an inferior oil which prevents the manufacturer from receiving repeat orders through the consumer's dissatisfaction over his original purchase.

Since it is impossible, with thousands of outlets, to determine the integrity of each dealer is there any satisfactory alternative to packing the product at the plant and placing quantities which the consumer is used to purchasing in unit containers which will not permit substitution or refilling?

Branding drums of lube oil will not serve the purpose. To provide rea-protection the oil must carry the manul

facturer's brand from the refinery right to the crank case. That means packaging in quart containers of a type that must be destroyed in opening. If the oil is packaged only up to the dealer and the drum opened by him and distributed in smaller units to consumers all the sales work and all the extra cost that have been built into the product may fall down because of the ease with which an unethical seller may add to his own profit and tear down the reputation of the manufacturer by substitution. Supplying these dealers with glass containers into which in theory they will place the oil only serves to enhance the illusion to the consumer and to encourage substitution.

Against the admitted advantages of packaging a product such as lube oil the one objection urged is that of increased cost. In handling oil on a fairly large scale it is unlikely that there would be a very great difference in cost. Admitting that packaging of oil would be slightly more expensive than the present method of bulk selling it would admit certain economies in handling and would permit the junking of considerable equipment now employed in distribution. Taking into account the gallonage saved from the bootlegger by packaging, which in some quarters is estimated as high as 20 percent, and including the value of the insurance to consumers that they are getting what they have paid for, the use of containers will show a financial advantage.

Six benefits at least the manufacturer of lubricating oil can count on from the packaging of his product:

1—It protects his brand against adulteration or substitution.
2—It protects the customer whom he has spent many dollars to convince of the value of his product.
3—It widens his distribution since the use of individual containers makes possible the use of additional retail outlets—hardware stores, for example.
4—It makes possible the reduction of stocks at distribution points, provides better control and insures a more rapid turnover.
5—It adds to the cleanliness of dealer stations since it eliminates the problem created by lube oil drip.
6—It insures the delivery of oil free from dust or grit.

A number of oil companies are experimenting with several types of lube oil containers, testing them in various local territories. Obviously this is a sound plan of procedure. It enables the company to learn the consumer's reaction to a packaged product and to determine what sort of package carries the greatest appeal. While in some cases the tests that are being made have not been carried far enough to furnish a basis for general conclusions one company which has introduced packaging on a commercial scale and has advertised its use of containers is reported to have doubled its lube oil sales since introduction of the system.

This discussion is concerned only with the idea of packaging. The executive who is convinced that it offers definite advantages or that the plan deserves at least a trial can determine for himself the style of container to adopt. Several are available. Four are shown in accompanying illustrations. Two of these are of tin and may be had in one, four and five quart sizes. The other two are of specially treated paper. Each of these containers is destroyed by opening.

Machines have been perfected which will fill the containers, seal, label and deliver them in glued cartons holding 24 one quart packages ready for shipment by railway or truck. The machines are set up at some convenient location in the refinery so that from the time the oil leaves the refiners' hands until it is poured into the crankcase it travels in an unbroken package with its contents fully protected against contamination, adulteration or substitution.

▼

UNITED STATES

	Daily Production bbl.	Daily Runs to Stills bbl.	Gasoline Stocks bbl.	Imports for week bbl.	California Shipm. East for week bbl.
Week Ending Dec. 3..	2,127,550	2,080,000	49,720,000	492,000	434,000
	363,700*				
Week Ending Dec. 10..	2,123,850	2,075,000	49,528,000	1,157,000	230,000
	350,150*			55,000**	
Week Ending Dec. 17..	2,060,100	2,165,000	49,935,000	797,000	222,000
	334,450*				
Week Ending Dec. 24..	1,760,330	2,160,000	51,070,000	642,000	234,000
	Shut-in*				

Underlined figures indicate improvement in statistical position—decrease in production, runs to stills, gasoline stocks or imports.
* Production of the Rusk-Gregg field, East Texas.
** Imports of gasoline, included in first total.

Annual Summary

1. **1932 was the first year of declining motor fuel demand.**
2. **Crude oil prices were very well maintained throughout the year.**
3. **Refinery gasoline prices were quoted above 4 cents a gallon in the Group 3, Oklahoma, market during all of the heavy consumption season, but were weak in the first three and in the last two months of the year due to underselling and dumping, more particularly in North and East Texas and in Texas Panhandle.**
4. **In May the Supreme Court of the United States upheld the Oklahoma proration laws which limit production on the basis of physical and economic waste allowing the state regulating agency to take into consideration reasonable market demand.**
5. **In June import duty was imposed on crude oil and its products, resulting in actual gains to domestic producers.**
6. **In October the Texas legislature passed a statute similar to that in Oklahoma, allowing the Texas Railroad Commission to prorate the oil fields on the basis of both physical and economic waste.**
7. **State taxes on motor fuel continued excessive, reaching $244,746,853 for the first six months of 1932, not including the Federal tax of one cent a gallon which became effective on June 21.**

THE OIL industry enters 1933 with well defined proration laws, validated by the highest courts, while the large and small companies are for the first time cooperating in an effort to reduce both production

and runs to stills to a volume not exceeding consumption. The industry is still handicapped by excessive overcapitalization and overexpansion in marketing and retailing branches, and by the motor fuel tax problem, as already indicated. Prospects of the oil industry for 1933 depend entirely upon the success of cooperative efforts to limit production to demand; upon the elimination of unsound and unfair marketing policies and upon at least some moderation and rationalization of the tax burdens.

Trade Readjustment

DURING October, the fourth month after imposition of a tariff on crude oil and its products, total petroleum imports increased appreciably above the September volume, reaching 3,849,000 bbl. as compared with 3,137,000 bbl. imported in the preceding month. For the first four months after the imposition of the tariff, July to October inclusive, the total imports averaged 3,210,000 bbl. per month, as compared with a monthly average of 9,090,000 bbl. for the first six duty-free months of 1932. Motor fuel imports continued nominal in October amounting to only 161,000 bbl., as compared with 62,000 bbl. imported in September. In the first four months after imposition of virtually prohibitive tariff on motor fuel, July to October inclusive, there was brought into the United States an average of 99,500 bbl. per month of that product, as compared with a monthly average of 1,272,000 bbl. of motor fuel imported for the preceding six duty-free months, January to June, 1932, inclusive.

The volume of exports of petroleum and its products for the month of October remained practically unchanged, the total volume being 8,035,000 bbl., as compared with 7,896,000 bbl. exported in the preceding month, while motor fuel exports in October decreased to 2,379,000 bbl. from 2,735,000 bbl. exported in September.

Accordingly the post-tariff trade readjustment, noted in the preceding monthly reviews of WORLD PETROLEUM, was extended into October. For the four months after the imposition of the tariff, July to October inclusive, compared with the first six duty-free months of 1932, the reduction in the average per month motor fuel imports of 1,172,500 bbl. was greater than the decline in the motor fuel exports by 92,500 bbl. Imports of all other petroleum products contracted by 4,707,500 bbl. per month during the July to October post-tariff period, while exports decreased only 642,000 bbl. per month, as compared with the averages for the preceding six duty-free months, thus leaving an apparent favorable balance of 16,632,000 bbl. for the four-months period, equal to 135,600 bbl. per day, which was supplied from domestic storage and not from imported products.

Duty on petroleum products imported into United States is practically the only tax measure made effective June 21, 1932, which is producing a revenue greater than originally estimated, a total of $2,151,000 having been collected till September 30.

Federal revenue bill of June 21 was recently construed so as to classify naphthas as motor fuel and subject, therefore, to the 2½ cent per gallon import tax.

Motor Fuel in Balance

INDICATED domestic demand for motor fuel during October, 1932, averaged 1,040,000 bbl. per day, a decrease of 7.3 percent under the daily average for the preceding month, and 91,000 bbl., or 8.04 percent, under the domestic motor fuel consumption in October of 1931. For the first ten months of 1932 domestic motor fuel demand was 8.21 percent under the consumption in the same period of 1931.

Exports of motor fuel averaged 77,000 bbl. per day in October, 1932, a decrease of 15.37 percent under the preceding month, and 31.05 percent under exports in October of 1931. In the first ten months of 1932 exports of motor fuel from the United States declined by 20.82 percent under the exports in the same months of 1931. Total demand for motor fuel in October, 1932, thus decreased by 10.01 percent as compared with the same period of the preceding year, while in the first ten months of 1932 the total demand for motor fuel decreased by 9.52 percent under the same period of 1931.

On November 1, 1932, motor fuel stocks at refineries, terminals and in transit were 47,040,000 bbl., representing a net withdrawal of 893,000 bbl. from stocks on hand on October 1, indicating that the total demand for motor fuel during October exceeded the available supply by 28,800 bbl. per day. On November 1, 1931, total motor fuel stocks were approximately 46,906,000 bbl., indicating that supply and demand were well balanced during 1932, even though consumption declined by about 10 percent.

Refinery Runs

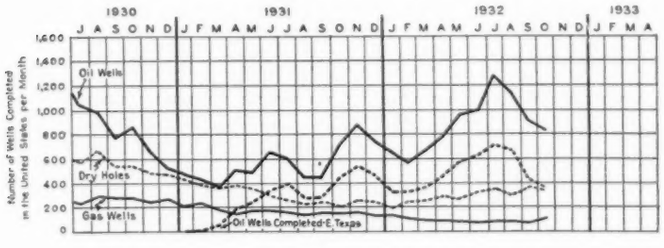
FOR THE week ended December 24 crude oil runs to stills continued at an unduly high level of 2,160,000 bbl. per day (Bureau of Mines), or considerably in excess of the 2,000,000 bbl. limit recommended by various economic agencies and bureaus of the industry.

For the first ten months of 1932 the crude oil runs to stills averaged 2,260,000 bbl. per day as compared with 2,475,000 bbl. per day run during the same period of 1931, a decline of 8.68 percent. During the same period gasoline recovery, straight-run and cracked, increased from 44.0 percent in 1931 to 44.4 percent in 1932. Recovery of cracked gasoline in 1932 increased to 20.5 percent of the total crude runs, from 19.5 percent recovered in 1931, while recovery of straight-run gasoline at the same time dropped to 23.9 percent from 24.6 percent, indicating the gradual change to higher octane products. Production of cracked gasoline may be anticipated to increase further, because new plant designs emphasize cracking of crude rather than of the topped product.

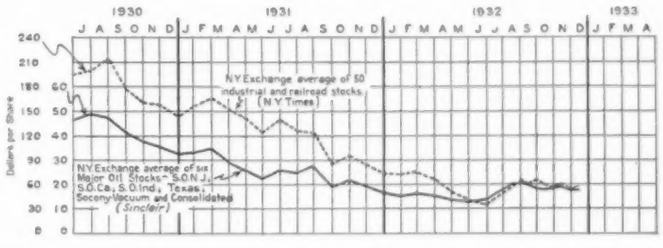
Prices Revised Downward

THE DECLINE in commodity prices in United States from 90.0 on October 15 to 82.0 on December 2 (MOODY'S INDEX), greatly accentuated the inevitable readjustment in crude and motor fuel quotations. Declines were precipitated by a number of unfavorable court injunction developments in Texas and in Oklahoma

U. S. drilling; comparison of oil wells, dry holes, and gas wells.



Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.



during the first week of December, when it was estimated that fully 100,000 bbl. of crude oil was produced illegally and sold at 45 to 50 cents per barrel, or as much as 60 percent under the top posted price. At the same time a large volume of distress gasoline was being sold under the market in North and East Texas and in the Texas Panhandle by refiners operating on cheap crude oil. Prior to readjustment of prices some operators having refineries and marketing outlets found it expedient to purchase for distribution cheap gasoline, rather than pay high prices for crude oil and lose money on refining.

On December 2 and 3 first declines in motor fuel prices took place in Oklahoma, forced by underselling tactics of small operators; Sinclair Refining Company was the first of the major concerns, followed by other marketers, to reduce tank wagon and service station prices two cents per gallon on all grades, the new prices, including taxes, being 12 cents a gallon for third grade, 15 cents a gallon for regular grade and 18 cents a gallon for Ethyl. By December 10 North and East Texas were flooded by cheap gasoline selling at almost any price, and on December 14 all major companies reduced retail gasoline prices one cent per gallon throughout the State of Texas. After the reductions in crude oil prices, which were announced on December 15, refinery gasoline quotations in the disturbed area declined to as low as 2⅜ cents a gallon for the low octane grade U.S.M., the price, however, rallied to 2⅞ cents a gallon after the East Texas shut-down.

Reflecting these disturbances in the Mid-Continent, corresponding declines in gasoline prices took place elsewhere in the United States. On December 21 the Standard Oil Company of New Jersey reduced tank wagon and service station prices throughout its territory by 0.7 cents a gallon, while on the same date the Standard Oil Company of New York, Inc. (Socony-Vacuum) reduced its prices 2 cents a gallon in New York City and on Long Island, and from 1 to 2 cents a gallon in other sections of its territory, making the New York City price 14.5 cents per gallon for regular grade, including 4 cents of Federal and state taxes. In tank car lots the Standard Oil Company of New York, Inc. on the same day reduced its prices ¼ of a cent per gallon for unbranded gasoline to 6 cents, and ¾ of a cent per gallon for branded grades to 6¼ cents. The Standard Oil Company of Ohio simultaneously announced throughout its entire territory a cut of one cent per gallon on its regular and Ethyl grades, and of 2 cents per gallon on its third grade competitive product.

On January 1 the Sinclair Refining Company (Consolidated) again reduced tank wagon and service station prices one cent per gallon on all three grades in all its territory east of the Rocky Mountains. By January 4 this cut had been met by all major marketers.

Refinery gasoline quotations on December 21 were: 2¾–2⅞ cents per gallon for 58–60 U.S.M., 57 and below octane rating in Group 3, Oklahoma market; 57 to 64 octane rating, U.S.M., commanded 2⅞–3¼ cents per gallon; and 65 and above octane rating, U.S.M., was quoted at 3½–3¾ cents per gallon. Gulf Coast prices for export declined in sympathy to 4 cents per gallon for 58–60 U.S.M. grade by December 21.

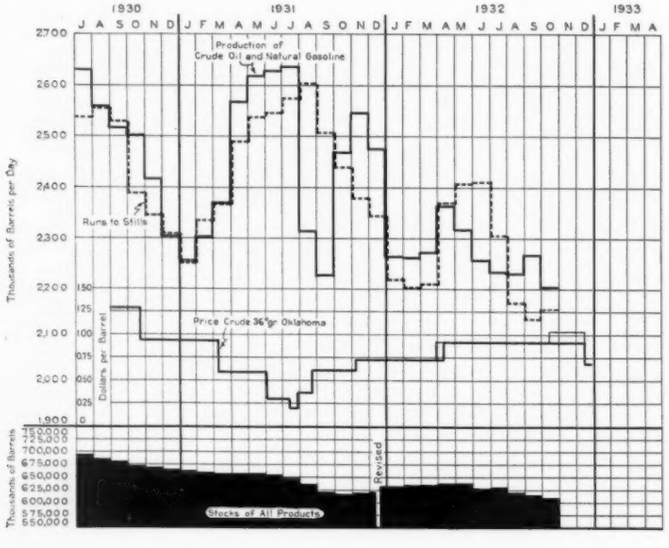
Natural gasolines turned strong seasonally appreciating ½ a cent per gallon from the preceding month, and were quoted on December 21 at 2⅞–3 cents per gallon for grade 26–70 in Oklahoma, at 2½–2⅝ cents per gallon in North Texas and at 3 cents per gallon in North Louisiana.

Kerosene prices remained unchanged, the 41–43 w.w. grade being quoted on December 21 at 3½–3⅝ cents a gallon in Group 3, Oklahoma market, while Gulf Coast prices for export were shaded slightly, dropping to 4¼ cents per gallon for 41–43 p.w. grade.

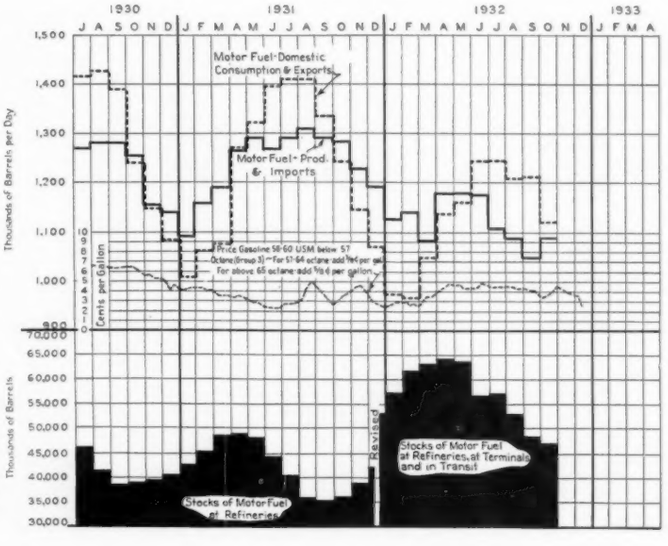
The dual schedule of crude oil prices continued in the Mid-Continent oil fields until December 15, when a radical 30 percent downward revision took place. Already by December 6, however, six purchasers who had been paying the higher crude oil price schedule with $1.12 top, returned to the postings existing prior to October 15 with $1.00 top price. At the same time much crude was being sold under the lower schedule at from 45 to 50 cents per barrel. On December 12 Danciger Oil and Refining Company reduced the price of Gray County, Texas Panhandle, crude from 88 cents to 68 cents for the 40 gravity grade.

The first major cut was initiated by The Texas Company which reduced the Oklahoma-Kansas-North Texas crude oil by from 12 to 22 cents per barrel, to 88 cents for 36 gravity; the East Texas crude by

U. S. production, runs to stills and price of crude oil in relation to stocks of all petroleum products.


1930
1931
1932
1933
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
Production of Crude Oil and Natural Gasoline
Runs to Stills
Price Crude 36° gr Oklahoma
Thousands of Barrels per Day
Dollars per Barrel
Thousands of Barrels
Revised
Stocks of All Products

U. S. consumption and exports, production, imports and prices of motor fuel in relation to motor fuel stocks.


1930
1931
1932
1933
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
Motor Fuel-Domestic Consumption & Exports
Motor Fuel-Prod. & Imports
Price Gasoline 58-60 USM below 57 Octane(Group 3) — For 57-64 octane add ¼¢ per gal. For above 65 octane add ½¢ per gallon
Cents per Gallon
Thousands of Barrels per Day
Thousands of Barrels
Revised
Stocks of Motor Fuel at Refineries, at Terminals and in Transit
Stocks of Motor Fuel at Refineries

World Oil Production — Official Figures

All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. Barrels—Conversion ratio 7 bbl. = 1 ton)

Country	Total 1931	Daily Av. 1931	January 1932	February 1932	March 1932	April 1932	May 1932	June 1932	July 1932	August 1932	September 1932	October 1932	November	Daily Average Jan. to Nov.
United States	850,275,000	2,329,520	66,884,000	62,484,000	67,189,000	67,717,000	63,523,000	64,835,000	66,310,000	66,220,000	65,036,000	65,219,000	63,450,000[3]	2,145,872
Russia	156,342,900	428,336	13,059,900	12,194,000	13,852,300	13,101,200	13,437,200	12,971,700	12,923,400	12,721,800	11,598,300	11,928,700	11,022,900	414,362
Venezuela	120,069,462	328,957	9,939,027	9,469,873	10,398,514	10,870,615	11,219,908	11,151,490	9,822,428	9,562,777	9,080,050	9,392,894	9,003,428	328,093
Roumania	46,333,945	126,942	3,780,000	3,439,100	3,621,170	3,557,470	3,748,710	3,745,238	4,289,327	4,868,801	4,166,568	5,236,870	5,005,000[1]	135,696
Persia[2]	40,253,486	110,284	3,325,000	2,814,000	3,738,000	3,451,000	3,773,000	3,913,000	4,543,000	4,116,000	4,011,021	3,982,132	3,816,771	123,830
Mexico	33,038,853	90,517	2,869,177	2,761,064	2,967,842	2,922,309	2,926,574	2,701,184	2,505,879	2,462,961	2,513,673	2,569,559	2,632,862	89,054
Dutch East Indies	32,818,346	89,913	3,943,147	3,652,432	2,844,065	2,923,382	2,865,261	2,963,350	3,185,252	3,216,899	3,492,903	4,551,595	2,888,620	109,036
Colombia	18,237,190	49,965	1,533,969	1,401,554	1,668,508	1,655,922	1,682,223	1,627,377	1,455,599	1,444,432	1,374,006	871,510	734,845	46,119
Argentina	11,709,759	32,091	1,116,800	1,040,000	1,192,700	1,078,500	1,057,200	1,001,000	1,067,000	1,019,400	1,031,600	1,210,400	1,233,400	35,964
Peru	10,102,116	27,677	945,231	750,804	697,622	732,308	951,112	972,890	830,986	819,772	749,209	753,741	568,950	26,187
Trinidad	9,743,763	26,695	846,878	828,860	874,145	852,080	859,609	839,248	883,102	754,301	840,981	850,281	785,155	27,503
British India	7,830,101	21,452	750,251	698,645	719,337	681,942	739,570	672,613	750,793	795,954	527,759	700,000[1]	700,000[1]	23,095
Poland	4,397,760	12,049	351,365	324,100	334,495	336,231	340,200	336,000	351,603	345,408	185,500	327,194	332,262	10,640
Sarawak	3,338,472	9,146	210,748	200,102	197,050	191,282	187,859	177,023	195,188	192,293	187,397	189,315	168,000[1]	6,372
Japan and Taiwan[1]	1,884,285	5,162	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	6,403
Egypt	1,845,938	5,057	138,796	137,431	142,275	151,305	146,489	152,712	159,208	163,093	147,581	140,973	126,644[1]	4,796
Ecuador	1,750,633	4,796	126,406	111,361	126,024	133,844	139,389	137,437	143,010	135,063	128,698	134,809	127,372	4,309
Canada	1,583,339	4,338	96,912	90,841	97,484	95,585	95,221	89,533	86,969	85,229	79,813	78,845	77,107	2,906
Germany[5]	1,778,602	4,873	148,197	150,197[4]	262,528	141,780	150,000[1]	150,000[1]	150,000[1]	139,909[1]	129,633[1]	141,351	130,424[1]	5,057
Iraq[1]	1,200,000	3,290	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	3,283
France	512,862	1,405	46,000[1]	46,000[1]	46,000	46,000	46,000	46,000[1]	46,000[1]	46,000[1]	46,000	46,000[1]	46,000[1]	1,510
Others[1]	338,700	929	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	1,182
	1,355,385,512	3,713,394	110,442,804	102,925,364	111,300,059	110,970,755	108,219,525	108,813,795	110,029,744	109,441,092	105,657,692	108,656,169	103,180,740	3,531,269

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] A.P.I. [4] No production in Thuringia January 13 to March 10. [5] Including Thuringia. Sakhalin (Russian) included with Russia. Sakhalin (Japanese) included with Japan.

35 cents per barrel to 75 cents flat; the West Texas crude by 25 cents per barrel to 50 cents flat, and the Gulf Coastal crude by 4 to 16 cents per barrel to $1.06 cents top for 40 gravity and above, with corresponding reductions in all other fields. The Texas Company's announcement signed by its president, R. C. Holmes, read:

> At the present time more than one-half of the crude production in that general territory comprising the states of Texas, Louisiana, New Mexico, Oklahoma and Kansas is being run at materially less than our posted price. In this section The Texas Company is purchasing an average of about 72,000 bbl. per day and is producing 57,000 bbl., although its own wells could readily produce two to three times its entire crude requirements. This condition together with the disregard on the part of some for the state commission allowables, the readiness with which injunctions are sought and allowed against commission orders, and the failure on the part of a great many of the states to enforce gasoline tax collections from all alike brings about a market condition that makes it unwise for this company to continue buying at its present posted prices.

The Texas Company's action was followed on December 16 by all major purchasers led by the two subsidiaries of the Standard Oil Company of New Jersey, the Carter Oil and the Humble Oil and Refining Companies, by the Stanolind Crude Oil Purchasing Company (Indiana Standard) and by the Sinclair-Prairie Oil Marketing Company (Consolidated), but these companies while meeting The Texas Company's new price of 75 cents per barrel in East Texas field, reduced the Oklahoma-Kansas-North Texas crude oil 23 cents below The Texas Company's schedule, the price set being from 45 cents for 25 gravity to 77 cents top for 40 gravity (69 cents for 36 gravity); similarly the Humble Oil and Refining Company cut prices of Gulf crudes below The Texas Company's December 15 postings. With brief delays and in some instances step by step, as in the case of the Shell Petroleum Corporation and The Texas Company, the prices set by the Standard Oil Company of New Jersey were met by all other Mid-Continent purchasers by December 21, with the exception of the Magnolia Petroleum Company (Socony-Vacuum), which continued to pay somewhat higher prices. Companies which increased prices of crude on October 15 uniformly and officially regretted the necessity of current price reductions. The Sinclair Refining Company (Consolidated) stated:

> The drastically lower levels may be expected to lead to the establishment within a short time of prices far below former schedules. Sinclair will necessarily, but very reluctantly, follow this downward movement, believing that it will retard general recovery. . . .

In the light of the experience of the past two months it may be concluded that the price advance of October 15, negligible in itself, had for its primary objective prevention of reduction of the crude oil prices below the $1.00 schedule during the forthcoming slack consuming season, a reduction which appeared inevitable at that time. The advance, justified by its sponsors upon the orders of various state proration agencies reducing production, succeeded in postponing the decline in prices below $1.00 top for two months. On the other hand that advance has caused ill feeling among two groups of purchasers, resulted in the continuation of the over-drilling in the East Texas field, contributed to rapid development of the Conroe pool and did not result in lower production as was anticipated. Economically the advance was not justified. Psychologically the October 15 action was ill conceived and did not follow the excellent and successful precedent set by the Standard Oil Company of California on June 13, 1932, when that company offered a 25-cent per barrel advance subject to *de facto* reduction of California production to 476,700 bbl. and subject to continuation of output within that maximum. Illegal production and underselling in parts of the Mid-Continent are not unsurmountable obstacles, because similar conditions are to be found in the Los Angeles Basin fields, which in addition are situated in the area of large demand thus facilitating independent marketing of motor fuel at cut prices.

Effective January 1, 1933, the H. F. Wilcox Oil and Gas Company will base its buying price for crude oil in Oklahoma and Texas on the daily low refinery quotation for U.S.M. gasoline, below 57 octane grade, thus establishing a new purchasing principle. For each ⅛-cent

so quoted the company will pay 2½ cents a barrel for crude oil of 40 gravity and above, with a differential of 2 cents for each lower degree of gravity. At the current price of 3 cents for U. S. M. low octane grade gasoline the 40 gravity crude will be posted at 60 cents a barrel (52 cents for 36 gravity), or 17 cents under the currently paid price of 77 cents per barrel. A 4-cent quotation for low octane grade, U. S. M., gasoline would mean an 80-cent per barrel price for 40 gravity crude oil, and a 5-cent quotation—a $1.00 per barrel price. The new basis for crude oil posted prices more nearly approaches open market quotations, is not dependent upon individual and conflicting policies of various major crude oil purchasing companies, will be therefore open to less criticism by small independent operators.

Proration—Texas

WITH CRUDE oil quotations showing signs of weakness in the beginning of December, due to the apparent inability of the Texas Railroad Commission to enforce its orders of December 1 limiting production of the state to 849,625 bbl. and due also to illegal production and underselling, the Commission attempted to save the situation by further reducing the state's allowable to 789,745 bbl. The new order, effective December 10, reduced the allowable of the East Texas field from 325,000 bbl. to 310,000 bbl. per day, and of the Conroe field from 25,000 bbl. to 20,000 bbl., with variable reductions elsewhere in the state. The order of December 10 was not complied with due to legal developments.

On December 12 the United States Supreme Court handed down a decision by Chief Justice Hughes upholding the three-judge Federal Court which had granted the injunction restraining Governor R. S. Sterling, Adjutant-General W. W. Sterling and Brigadier-General J. F. Wolters of the Texas National Guard from enforcing military or executive orders regulating oil production and from interfering in any manner "with the lawful production of oil from complainants' property."

The decision of the United States Supreme Court was not of great importance to the oil industry, because the martial law enforced by Governor Sterling in East Texas during August and September of 1931 can be considered as a closed incident. Martial law was necessary at that time because of the lack of adequate laws. These have since been fully revised to meet the problem of enforcing proration. Judge C. B. Ames, president of the American Petroleum Institute, referring to the Supreme Court's decision pointed out that this decision does not in any way impair the power of states to regulate the production of crude oil for the prevention of waste. On December 21 Governor R. S. Sterling ordered the withdrawal of state troops from the East Texas field.

New and Old Crude Oil Prices

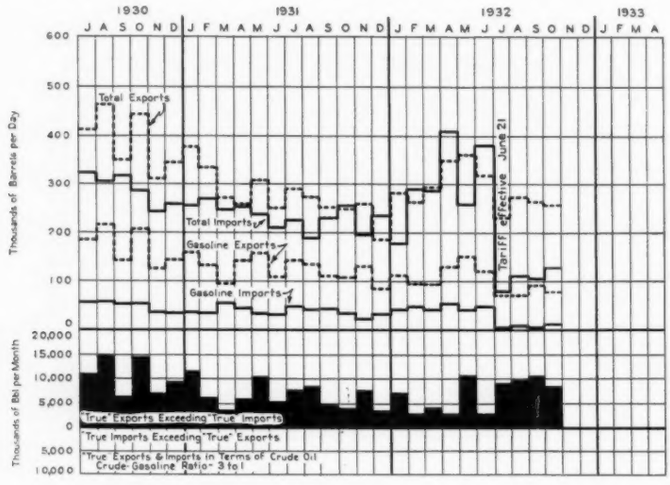
		April 11	October 15 not followed by S.O.N.J. & S.O. Ind.	December 15 * S.O.N.J. & others	Magnolia Soc.-Vac.
Okla., N. Texas & Kansas	28 deg.	$0.76	$0.88	$0.53	$0.65
	36 deg.	0.92	1.04	0.69	0.88
	40 deg. top	1.00	1.12	0.77	1.00
East Texas	flat	0.98	1.10	0.75	
West Texas	flat	0.65	0.90	0.50	
Darst Creek	flat	0.75	0.85	0.60	
Pettus	flat	1.00	1.00	0.80	
Gulf Coast (incl. Conroe)	25 deg.	0.80	0.90	0.70	
	30 deg.	0.86	0.96	0.80	
	40 deg.	1.00	1.10	0.88 (34 deg. top)	
Smackover, Ark.	flat	0.65	0.75	0.50	
Rocky Mountains		June 1			
Salt Creek	36 deg.	$0.92		0.69	
Sunburst		1.05		0.75	
Elk Basin		1.10		0.87	

*Reduced to S.O.N.J. schedule on January 1.

On December 11 the Ebony Oil Company and Rector and Davidson, independent operators, obtained from Judge W. F. Robertson of the 126th district court a temporary injunction restraining the Texas Railroad Commission and the state military authorities from enforcing the commission's new orders promulgated November 29 and December 8 which allowed East Texas wells variable production per day, from 25 bbl. to 43 bbl., depending on location of the wells in the field. On December 12 similar injunctions were secured by the Luling Oil and Gas Company, Boonie Oil Corporation, Pine Petroleum Company, Cullen Cil Company and others. As an immediate result of these injunctions it was reported that as many as 300 wells in the East Texas field were producing in excess of their allowables, while crude oil was being offered at 25 cents per barrel with no purchasers. Facing complete disorganization in the oil fields of Texas the Railroad Commission ordered, effective at noon on December 17, a complete shut-down of the East Texas field until January 1 ostensibly in order to permit the Commission's engineers to gauge bottom-hole pressure of the wells for the new hearing on allowables set for December 28. In the meanwhile the Commission ordered that oil in storage in the East Texas pool was not to be removed from the field during the shut-down but later was forced by new injunctions to rescind that part of the order and allow refiners to withdraw oil from storage if produced prior to the shut-down. The order was generally complied with, and the temporary injunctions granted by the 126th district court against enforcement of the new oil conservation law were dismissed.

The shut-down order, taking off the market some 5,000,000 bbl. of crude oil, was definitely a constructive measure, and it served almost immediately to stabilize the declining crude oil and gasoline prices. The bottom-hole pressure tests to be run by the Texas Railroad Commission in the field will form the basis for new allowables;

Total U. S. imports and exports and gasoline imports and exports in relation to true exports exceeding true imports.



the tests are to be made on a total of about 350 wells.

Proration—Oklahoma

ON DECEMBER 3 the state militiamen shut down for a short time two pipe lines operating from the Oklahoma City field for failure to have meters installed on lines and for faulty meters. Colonel Cicero I. Murray stated that all means of getting oil illegally from the field have been stopped. A day and night patrol of 12 militiamen has been assigned to duty on pipe lines, refineries and loading racks.

On December 13 the Oklahoma Supreme Court upheld the powers of the State Corporation Commission in principle, but declared present orders invalid. In a case brought by H. F. Wilcox Oil and Gas Company the court upheld the Commission's right to curtail production on an equitable basis between producers and between pools. But the court invalidated rules granting flat and water allowables in the Oklahoma City field as being local and special rules which the Commission is not authorized to make. All regulatory orders issued by the Commission since November 1, 1931, were accordingly held invalid. The probable result of the court's decision will be to check prosecution of overproduction made under old orders. The above decision was handed down on December 28, at which time the state Corporation Commission had completed new proration orders complying with the court's findings.

On December 23 a hearing was held before the State Corporation Commission to determine market demand and to grant allowables for the various state oil fields.

East Texas in 1932

THE VAST East Texas field, discovered early in 1931, reached the peak of its development in the middle of 1932. Entering the past year with 3,600 oil wells, the field witnessed the completion of 5,900 additional oil wells during the year, bringing the total number of producing wells to 9,500 by December 31, 1932. The rate of development of the East Texas field established many records in the past year, which are not likely to be exceeded in the future. Throughout last year, wells were being completed in the East Texas field at the rate of 16.2 each day, while during July, the most active month, average daily completions rose to 23.2. Total footage drilled in the field during the year reached 21,240,000 ft., about 4,000 miles, indicating a daily average of 58,250 ft. drilled throughout the year, while the July daily average was 83,500 ft. Cost of drilling in 1932, at $15,000 per well, was about $87,000,000, while the cumulative investment in drilling alone is now in excess of $140,000,000. The time necessary to complete a well in the East Texas field, to a depth of about 3,600 ft., is currently 14 days, including moving in rig and machinery, drilling, running and cementing casing, bringing the well in for production and tearing the rig down, with actual drilling time averaging but 5½ days.

The proved area of the East Texas field is about 110,000 acres, indicating that at the close of 1932 the wells were spaced one to 11.6 acres. A probable total of 12,500 wells will be eventually completed in the East Texas field reducing the spacing of wells to one to 8.8 acres. The economic limit of locations in the East Texas field may be considered at 5,500, figuring on one well per 20 acres, thus the probable overdevelopment will entail an economic waste of some $105,000,000.

The active and unsuccessful wildcatting campaign around the East Texas field continued with a diminishing momentum throughout 1932, a total of about 100 dry holes having been completed during the year. Approximately 100 dry holes were drilled in East Texas during 1931, thus bringing the total number of failures since the discovery of the field to 200.

The Texas Railroad Commission regulated the East Texas allowables continuously in 1932, reducing the per well per day production from 100 bbl. in January, to 37 bbl. by December. The Commission introduced a variable scale of allowables early in December, from 25 bbl. to 43 bbl. per well per day, basing the permitted production on bottom-hole pressures and location in the field, but the new method was criticized by some operators, who succeeded in obtaining injunctions restraining the Commission from enforcing its orders. Faced with the possible breakdown of proration machinery the Texas Railroad Commission on December 17 shut down completely all wells in the field, that being the second shut-down of the big field.

Prices for East Texas crude were fairly well maintained during 1932, except for the illegally produced crude which could be obtained at about half of the posted price. Official prices were 79 cents per barrel for 37 gravity crude from January 1 to April 11; 98 cents flat from April 11 till December 15; and 75 cents flat at the close of the year. From October 15 till December 15 some purchasers paid $1.10 per barrel.

Bottom-hole pressures in the East Texas field were closely watched throughout the year. The original static pressure in the field was about 1,630 pounds per square inch. By September, 1931, bottom-hole pressures had declined to about 1,500 pounds per square inch, after some 60,000,000 bbl. were recovered, a drop of one pound in pressure for each 460,000 bbl. produced. In the following year, ending September 1, 1932, the bottom-hole pressures declined to 1,400 pounds per square inch, while 130,000,000 bbl. were recovered, a drop of one pound in pressure for each 1,300,000 bbl. of crude produced. It is not expected that a similar high recovery for each pound drop in pressure will be maintained in future, because of the declining gas volume contained within the oil and also because of less effective water drive as the oil recedes eastward in the pool. An average future recovery of between 800,000 bbl. and 900,000 bbl. for each pound drop in bottom-hole pressure can apparently be counted upon. East Texas wells will stop flowing in all probability when bottom-hole pressure declines to about 800 pounds per square inch, indicating a future flowing recovery from the field of some 500,000,000 bbl. The East Texas field has produced to December 31, 1932, about 228,000,000 bbl., thus the cumulative flowing recovery from the field may reach 728,000,000 bbl., while an additional 500,000,000 bbl. will probably be recovered by gas-lift, pumping and other mechanical means, bringing the gross cumulative recovery from the East Texas field to 1,125,000,000 bbl., or to 10,250 bbl. per acre of its proven area. To December 31, 1932, the field produced 2,070 bbl. per acre. The original water level of 3,320 ft. sub-sea elevation has risen to an estimated 3,310 feet sub-sea elevation.

Chemical Treatment

THE CHEMICAL treatment of oil wells to increase their production reviewed in detail in the December, 1932, issue of WORLD PETROLEUM, scored another striking success in a field particularly suited for its application, the Zwolle, in Sabine parish of Louisiana. The producing formation in Zwolle is chalk, greatly varying in tightness.

Acid was first applied in the Pelican Natural Gas Company's No. 16 Louisiana Long Leaf Lumber Company, an 18-bbl. producer, and its production was increased to 560 bbl. for the first 24 hours, a 3,100 percent increase. Less spectacular were increases in the Sabine Production Company's No. 1 and 2 Pearce, in which production was stepped up from 55 bbl. to 150 bbl. and from 62 bbl. to 125 bbl. respectively. Experiments are now being conducted in Zwolle field on wells within the field that were practically dry.

BASIL B. ZAVOICO

RUSSIA

Official Figures of Soviet Oil Operations*

	Crude Production (bbl.)	Daily Average (bbl.)	Run to Stills (bbl.)	Drilling (feet)
January	13,059,900	421,300	11,927,882	152,533
February	12,194,000	420,482	11,428,900	193,185
March	13,852,300	449,197	12,886,700	240,433
April	13,101,200	436,707	12,737,200	250,854
May	13,437,200	433,461	13,057,800	262,295
June	12,971,700	432,390	12,917,100	248,138
July	12,929,400	416,884	12,256,300	222,342
August	12,721,800	410,380	11,725,700	171,665
September	11,598,300	386,610	11,021,500	189,298
October	11,928,700	384,797	11,179,700	184,880
November	11,022,900	367,430	13,472,000	158,670
Total 11 mo. 1932	138,817,400	414,380	134,610,782	2,274,293
1st quarter 1932	39,106,200	429,738	36,243,482	586,150
2nd quarter 1932	39,510,100	434,177	38,712,100	761,287
3rd quarter 1932	37,249,500	404,886	35,003,500	583,105

Revised quota 1932—181,800,000 bbl. Or 525,400 bbl. daily average.

* Crude oil conversion ratio: seven bbl. = one ton.

AZNEFT share of crude production in November amounted to 6,615,000 bbl. or 88 percent of the plan for the month.

BAKU. The Kala oil field which has been explored during the past 12 years has been brought into operation and made an addition to the Ordzonikidze group of oil fields of Baku and will be connected by pipeline to the refineries. There are at present eight wells in the field of which one well is producing gas and oil and another well is flowing oil.

Wells completed recently are: At Sulu-Tepe a gusher flowing 22,000 bbl. of crude per day, at Lok-Batan a gusher flowing 7,000 bbl. of crude per day, at Ker-Ges a gusher flowing 1,400 bbl. of crude per day and North Bingadi a gusher flowing 1,000 bbl. of crude per day. Further drilling for commercial production at all these locations has been discontinued owing to lack of drilling equipment.

STERLITAMAK. A gusher has been completed at Ishimbayevsk at a depth of 2,300 ft. During the first 10 hours of operation the well yielded over 1,000 bbl. of crude and was finally brought under control after 30 hours. All storage facilities have been completely filled with oil.

SVERDLOVSK. A deep well drilled at the abandoned Chussoff Village oil location was completed as a flowing well producing 100 bbl. of crude under high gas pressure during the first half hour after which the well was shut in. Laboratory tests of this crude reveal 25 percent gasoline content and rare aromatic hydrocarbons.

UFA. Exploration drilling at Ishimbayevsk has established that the oil field extends over an area of eight square kilometers the oil deposits of which are estimated by Soviet authorities at 175,000,000 bbl. of crude. Twelve hundred rigs are to be erected in this field with intervals of 75 meters between wells. The 1933 plans call for completion of 20 wells which are expected to produce 420,000 bbl. of crude to be treated at a refinery that will be erected at a point on the railroad which is to be constructed between Ishimbayevsk and Ufa. These plans are based on the completion of a few flowing wells; field development, refinery construction and railroad still being merely future plans.

EMBA. At Kostchagil in the Emba district a gusher has been brought in flowing 1,400 bbl. of high grade crude per day from a depth of 1,350 ft.

MOSCOW. According to a TASS (Official Soviet Telegraph Agency) cable Soyusnefteexport has recently signed a contract for Soviet oil to be shipped to Canada. The first shipments of Soviet oil to Canada were made in 1932 and the total for the year amounted to about 450,000 bbl. for a total value of $500,000. The new contract covers the year 1933 and calls for about 1,000,000 bbl. of petroleum products representing a total value of $1,500,000 according to this report.

ANOTHER TASS message tells of a contract signed between the Soyusnefteexport and the Western India Oil Distributing Company. (Represented by Mr. Djehangor Rustem Vakil) for shipment of Russian oil products to India. The contract which has been signed at Moscow is for several years and calls for over 7,000,000 bbl. of petroleum products except gasoline.

MR. DOBROWAY, a Soviet engineer of Hungarian descent, has invented a cracking process which operates under normal atmospheric pressure and yields a high grade of gasoline without formation of coke. The fuel consumption of this process is said to amount to between four and five percent of the cracking input.

Second 5-Year Plan

REFINERY yield of gasoline from crude is expected to increase from 12.7 percent in 1932 to 18.6 percent in 1937 compared with a present yield of approxi-

Statistical Review of the Second Russian Five Year Plan in Comparison with Accomplishments for 1931 and 1932

	Official Figures	Estimate	Second Five Year Plan				
	1931	1932	1933	1934	1935	1936	1937
Production [1]	156,343	185,276	206,500	241,500	297,500	374,500	484,400
Light crude oil	121,375	139,545	140,770	153,832	175,560	201,810	225,155
Heavy crude oil	34,968	45,731	65,730	87,668	121,940	172,690	259,245
Runs to Stills [1]	139,559	162,365	173,110	205,450	271,950	356,475	428,750
Caucasus	136,934	159,390	169,400	187,075	211,750	225,575	233,800
Other Russia	2,625	2,975	3,710	18,375	60,200	130,900	194,950
Drilling [2]	2,310	3,316	5,200	7,260	10,560	14,850	19,800
Turbo-drilling	45	116	415	1,237	2,640	4,950	9,900
All other	2,265	3,200	4,785	6,023	7,920	9,900	9,900
Transportation [1]	256,200	338,100	1,015,000	Figures for the last four years of Second Five Year Plan not yet available.			
Water	116,200	154,700	504,000				
Rail	108,500	140,000	301,000				
Pipeline	31,500	43,400	210,000				
Refinery Construction [3]							
Pipe Stills	.....	.....	.....	63,000	63,000	56,000	273,000
Vacuum Stills	.....	.....	5,040	5,040	1,680	5,040	20,160
Cracking Units	.....	.....	10,500	21,700	36,050	41,230	41,300
Liquid phase	.....	.....	10,500	16,800	9,450	4,830	.....
Vapor phase	.....	.....	.....	2,100	9,800	23,800	10,500
Liquid-vapor phase	.....	.....	.....	2,800	16,800	12,600	30,800
Capital Investment [4]	.....	407,500	724,700	950,800	1,108,400	1,361,600	1,598,100
Production and pipelines	.....	292,000	498,200	627,100	779,600	1,017,300	1,269,600
Refineries	.....	115,500	226,500	323,700	328,800	344,300	328,500

[1] Figures in thousands of barrels of 42 U. S. gallons. [2] Figures in thousands of feet. [3] Figures for charging capacity in thousands of barrels of 42 U. S. gallons. [4] Figures in thousands of roubles.

mately 44.4 percent in the United States. Yield of ligroin, used in tractor fuel, is expected to increase from 2.9 in 1932 to 5.9 percent in 1937. On the other hand kerosene yield is expected to drop from 20.3 percent in 1932 to 17.1 percent in 1937 compared with United States average yield of 4.4 percent. Yields of lube oils are not expected to increase in percentage remaining a little better than 4.5 percent in comparison with 3.0 percent yields of lube oils in the United States. Gas and Diesel oils are to be increased 8.8 percent to 18.4 percent in 1937. Yield of distillation products including bitumen, coke, gas, and fuel oil is expected to increase from 50.8 to 64.6 percent compared with United States yield of these products of 57.9 percent.

Pipelines

THERE were approximately 3,200 kilometers of pipeline in Soviet Russia on January 1, 1932 against a planned pipeline system for 1937 extending over 9,950 kilometers. This total is to be laid, 2,780 km. in the Caucasus, 1,700 km. in Middle-asia, 680 km. in Ukraine, 4,365 km. in the Transvolga-Kazakstan-Ural and Western Siberia regions. All other regions will have a total of 425 km. of pipeline.

Domestic Consumption

TOTAL consumption during the first six months of 1932 amounts to 39.9 percent of the plan for the year as against 42.0 percent of the plan for the year attained during the corresponding period of 1931. While the supply of tractor fuel during the first six months of 1932 was satisfactory, delivery of kerosene for illuminating purposes to the population had to be rationed owing to the fact that actual demand increased over last year more than 35 percent. Supply of gasoline has been satisfactory owing to the considerable growth of cracking. Total consumption of gasoline during the first six months of 1932 exceeded the total consumption of the entire year 1931.

Russian Domestic Consumption of Petroleum Products January to June, 1931 and 1932

(Barrels of 42 U. S. gallons)

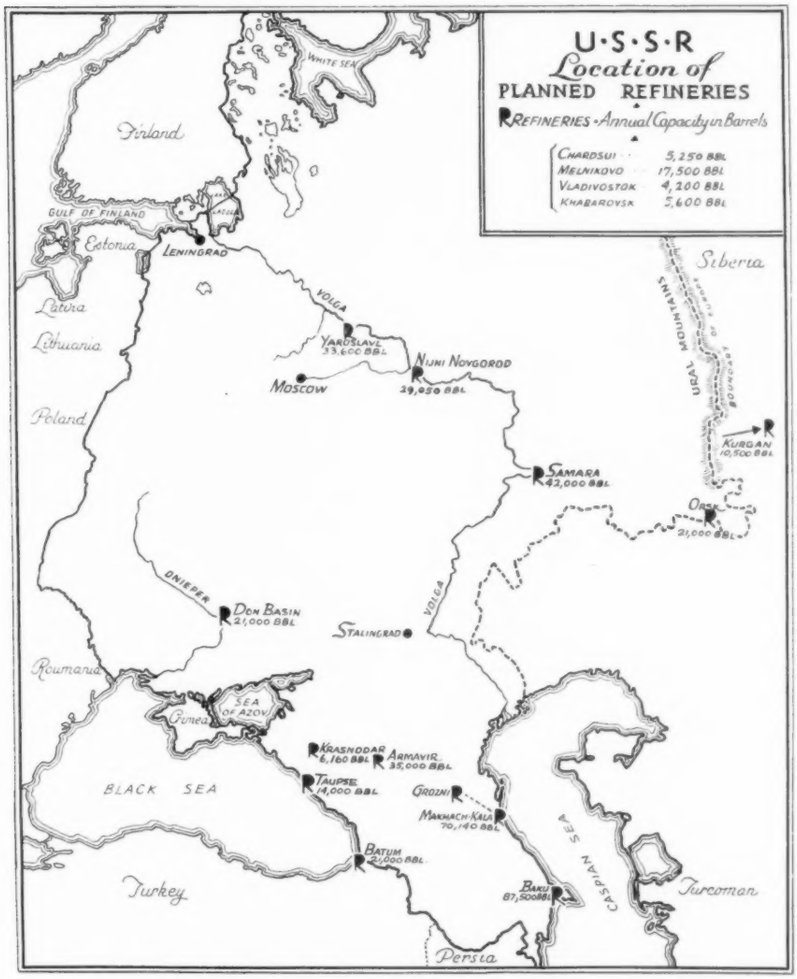
	Jan.-June 1931	Jan.-June 1932	Increase percent
Motor fuel	1,428,900	2,260,100	58
Kerosene	8,942,100	11,385,000	27
Ligroin	724,000	923,800	28
Lube oils	1,871,100	2,226,700	52
Fuel oil	24,369,800	25,521,500	17
Grease (tons)	1,000	3,100	151
All other products	705,600	819,700	12
Total (excluding grease)	38,041,500	43,136,800	20

During the period covered by the Second Five Year Plan Soviet Russia expects almost to triple its consumption of petroleum products, a tremendous increase in the amount of motor fuel being anticipated as a result of the extension of the use of automobiles and airplanes.

Planned Domestic Consumption of Petroleum Products in 1937 as Compared to 1932

(Barrels of 42 U. S. gallons)

	1932	1937
Motor fuel	8,755,000	73,525,000
Tractor fuel	15,300,000	56,512,000
Kerosene	13,500,000	33,750,000
Lube oil	7,805,000	22,134,000
Fuel oil	61,000,000	56,000,000
All other products	8,587,000	76,616,000
Total	114,947,000	320,537,000



Soviet Petroleum Exports by Countries of Destination

(Barrels of 42 U. S. gallons)

Italy	5,534,200	5,541,900
France	4,682,300	5,341,000
England	6,015,100	3,114,300
Germany	2,242,100	2,603,300
Spain	445,200	2,162,300
Holland	253,400	362,600
Belgium	1,441,300	1,479,100
Greece	291,900	318,500
Egypt	677,600	1,386,700
India	776,300	1,004,500
Sweden	814,800	1,235,500
Denmark	552,300	509,600
Norway	105,700	299,600
Turkey	800,100	646,800
Persia	296,100	341,600
China	99,400	455,000
Japan	1,334,900	81,900
Argentina	15,400	.....
All other including bunkers	1,475,600	4,381,300
	27,853,700	31,265,500

Exports

SOVIET petroleum exports in the first nine months of 1932 show a considerable increase over exports for the same period of 1931 but it should be taken into consideration, as pointed out elsewhere in this issue, that losses in the British market, in addition to being large, represent greater actual loss in revenue than new contracts made during this year.

J. WEGRIN

ROUMANIA

BUCAREST, DECEMBER 20

THE ROUMANIAN delegation, consisting of Messrs. Osiceanu, Stern, Marinescu, Hughes, Masterson and Ficsinescu, are at present in Paris completing details of the Roumanian participation in the international agreement.

The lengthy discussions on the question of repartition of quotas for export and for the internal market to be distributed among the producers, failed to give satisfactory results. Following Mr. Arnott's telegram, however, which was an evidence of the fact that the International group had begun to doubt the sincere desire of the Roumanian group to adhere to the international agreement, Roumanian companies have tackled more energetically the question of restriction of production. Negotiations were carried on this time in a quite different tempo and spirit.

A considerable drop in the prices of petroleum products indicated anew the desirability of international cooperation in export markets. As the Roumanian oil industry had no doubts about the outcome of continued failure on their part to fulfil the terms of the agreement, the opposition to a production restriction program on the part of the oil companies was weak.

The oil companies are divided into two groups: the big ones, Astra-Romana, Steaua-Romana, Romano-Americana, Colombia, Unirea, Credit Minier, Concordia and Prahova, have been allotted approximately 105,000 bbl. out of the 130,000 bbl., the figure to which the Roumanian production is to be restricted. The remaining 25,000 bbl. have been allotted to the smaller companies, all of them having adhered to the scheme, with the exception of the I.R.D.P. and the Sondajul companies, the latter being in a period of reorganization under the control of the National Bank. As the I.R.D.P. which has a production of approximately 2,000 bbl. per day, has asked an allowable of double its present production, it has not been possible to include it in the general arrangement.

Individual quotas of the larger companies will be settled in Paris, as most of them are controlled by interests connected with the international group.

Allowable production for the smaller companies will be determined by a committee which consists, so far, of Messrs. Teodoreanu (Petrolul Romanesc), Mitrany (Cometa), and Margulius (Sondrum). This committee will also decide what measures will be taken regarding outsiders and newcomers.

A delicate situation has arisen as the result of drilling being carried on in the Gura-Ocnitei field by several groups of engineers independently financed. As there are signs, however, that excessive drilling in the Gura-Ocnitei-Gorgoteni-Rasvad field is deteriorating the productivity of that region, it is to be expected that the question of overproduction by independent producers will probably solve itself in the near future. Wells recently drilled at Gorgoteni by companies such as Unirea, Colombia and others have come in with productions far below expectations. Some engineers maintain that within six months the production of Roumania will naturally adjust itself to the figure indicated by the international group.

It is expected that, once production is restricted, there will be little difficulty in completing arrangements regarding export quotas and the partition of the domestic market as smaller refiners who might raise objections will find their supply of crude cut off.

E. I. MARGULIUS

▼

VENEZUELA

NO DEVELOPMENT in the Venezuelan field excites more interest than that of the Standard Oil Company of Venezuela (New Jersey Standard) at Cumarebo, in the northerly state of Falcón.

This field is included within the "Jiménez Arraíz" concession held by the North Venezuelan Petroleum Company, which company transferred 10,000 hectares thereof to the Standard Company.

The latter company is conducting an intensive development in the area acquired, and has at present four strings in operation, with a constantly increasing production of high gravity oil. The oil now under production ranges from 45 deg. to 47 deg. gravity (A. P. I.), and is by far the highest grade oil yet found in the Venezuelan field. In October the millionth barrel was produced at Cumarebo, and in addition to the shipments to the company's refinery at Aruba, there has been a shipment of 77,632 bbl. to France. It is also reported that a similar shipment was made by the Venezuelan Gulf Company to the same destination, some weeks ago.

THE Standard Company is about to undertake a seismographical survey of the Maracaibo lake basin, which is expected to be accomplished within the coming eight months. The examination will cover the shallow area of the lake from Maracaibo city to the sea; southward, along the shallow water by the westerly side of the lake, to the Catatumbo river, and inland along the Negro and Santa Ana rivers; the survey will also include the shallow area about San Lorenzo, on the easterly side of lake Maracaibo.

A NEW company, the Alamo Oil Corporation, has been registered in Venezuela. The company was incorporated in Delaware in 1931, and is understood to be identified with the Buckley interest. Some 46,000 hectares of exploitation concessions have been transferred to it, distributed in the states of Zulia, Falcón, Anzoátegui and Guárico.

DEVELOPMENT of the Barco concession in Colombia, by the Gulf Oil Company, is in active progress. Some weeks ago there was a shipment of 900 tons of

material up lake Maracaibo, destined for the Catatumbo field, with still further despatches in preparation.

Oil production in Venezuela during the current year has averaged about 10,045,000 bbl. monthly, with the figures running below the average during recent months. This indicates a total production for the year 1932 of approximately 119,000,000 bbl. as against 120,000,000 barrels in 1931 and 140,000,000 in 1930.

C. N. CLARK

FINANCE

London: December

EVENTS in Persia, and their repercussions in this country, have completely dominated the oil share market during the greater part of the past month. News of the annulment of the Anglo-Persian's concession was followed by a slump in the shares immediately concerned, and this was reflected in almost every share in the market. Some resistance was shown to selling pressure at the lower level of values, but weakness was renewed when the company published a full statement of its case, and again when the question of the concession was brought up in the British Parliament. Part of the general selling was undoubtedly attributable to the connection which other concerns have with Anglo-Persian. Burmah, for example, has a very large shareholding in the company, with which Shell Transport also has a marketing partnership in Britain through Shell-Mex and B. P. Limited. Lower prices for oil shares generally, following the Anglo-Persian news, were due in part to the reminder it gave to the market and investors that the great majority of British oil concerns work under concessions of one kind or another, and that any company doing so is not always master in its own house. Most shares show a reasonable recovery from the lowest points recently touched. This has been due to anticipation of the successful conclusion of the November 29 Paris conference with Roumanian interests, and the hope of a further advance in British petrol prices. Buying has been largely professional, the Anglo-Persian affair having put the public out of the market for the present. A renewal of public interest, however, would soon follow any favorable development.

LOWER prices for Anglo-Persians are due to uncertainty on the future of the D'Arcy Concession rather than to the belief that the annulment is more than a tactical move by Persia to bring negotiations to a head on new concession terms. The royalty due by the company to the Persian Government, fixed many years ago at 16 percent of net profit from actual production, has fluctuated greatly from year to year, and the decline to £134,750 for 1931 naturally disorganised the Persian Budget by reducing an important item of revenue. Market observers now admit that Persia has a strong case for consideration. What is chiefly disturbing the market is the consideration that alteration in the terms of the royalty, providing for a larger payment, may make an appreciable difference to Anglo-Persian dividends. Royalty provisions in the company's accounts have averaged £770,000 per annum for the past three years, and ordinary dividends have absorbed an average of £1,790,000. Any big increase in royalty payments would obviously cut into the amounts distributed to shareholders. The passing of the Anglo-Persian interim dividend aroused little interest. Attention was concentrated on the question of the Concession at the time the omission of the dividend was announced, and an interim payment had not been generally expected in any circumstances.

INCREASED trading revenue was largely responsible for the advance in net profits of Steaua Romana (British) from £70,226 in 1930–31 to £84,607 for the year to June 30 last. The final dividend of two percent, again making four percent for the year, was earned with a fair margin, a transfer of £30,000 to reserve account involving a reduction of only £5,393 to £30,619 in the undivided surplus. In their statutory certificate to the accounts, the company's auditors again called attention to the valuation placed on the company's interest in Steaua Romana, the Roumanian operating company, which they regard as above the market value. They also made a reservation concerning the advances made by the British company. Sir Albert

London Stock Exchange Prices

1932 High	1932 Low	Last Year's Div. % per Ann.	Share	November 11–December 11 First	High	Low	Last	Change
1 1/16	9/32	3 1/2	Anglo-Ecuadorian	17/32	1 1/16	17/32	5/8	+3/32
1 7/8	3 1/32	10	Anglo-Egyptian "B"	1 11/16	1 13/16	1 1/2	1 7/16	—1/8
2 29/32	1 3/16	5	Anglo-Persian	2 3/8	2 7/16	1 23/32	1 23/32	—2 1/32
1 1/8	15/32	20	Apex Trinidad (5s.)	1 5/32	1 1/16	31/32	1 1/32	.....
3/4	3/8	....	Attock	17/32	17/32	1/2	1/2	—1/32
9/16	5/16	5	Brit. Borneo (6s.)	3/8	7/16	3/8	13/32	+1/32
1/4	1/8	....	Brit. Burmah (8s.)	7/32	7/32	3/16	3/16	—1/32
1/4	1/16	....	Brit. Controlled ($5)	3/16	7/32	5/32	3/16	.....
1/2	1/16	....	Brit. Controlled Pfd. ($5)	15/32	15/32	13/32	7/16	—1/32
3 15/32	1 13/16	17 1/2	Burmah	3 7/32	3 11/32	2 13/16	2 31/32	—1/4
7/16	7/32	....	Canadian Eagle (No par)	9/32	5/16	9/32	9/32	.....
3/8	1/2	....	Creole (No par)	3/4	13/16	3/4	25/32	+1/32
7/32	1/16	....	Kern River (10s.)	1/8	1/8	1/8	1/8	.....
2 5/16	31/32	12 1/2	Lobitos	1 15/16	1 15/16	1 3/4	1 13/16	—1/16
15/32	1/4	....	Mexican Eagle ($4 Mex.)	3/8	3/8	11/32	3/8	.....
19 1/2	4 1/2	....	Pan American "B" (New)	18	19	16 1/2	17 3/4	—3/4
1 1/16	5/32	....	Phoenix	9/16	5/8	17/32	9/16	.....
20 1/2	10 1/4	6	Royal Dutch (fl. 100)	17 11/16	18 1/2	17 1/2	18	+3/16
2 23/32	1 7/16	7 1/2*	Shell Transport	2 3/8	2 15/32	2 29/32	2 3/8	.....
9/16	5/16	4	Steaua Romana	7/16	15/32	13/32	7/16	.....
2 3/4	1 1/8	12 1/2	Trinidad Leasehold	2 1/16	2 23/32	2 3/16†	2 9/16†	—3/8
9/32	3/32	....	Untd. Brit. of Trinidad (6s. 8d.).	7/32	1/4	5/16	7/32	.....
1 25/32	7/8	10	Venezuelan Oil Concessions	1 23/32	1 11/16	1 1/2	1 19/32	—1/16

Nominal value of shares £1 unless otherwise stated by bracketed figures.
* Denotes tax-free dividend. † Denotes "Ex-dividend" price.

Stern, presiding at the annual meeting, stated that £20,000 of the capital advanced by the company had been repaid during the year, while a further £120,000 had been paid off during the current financial period. A return to prosperity in the Roumanian industry seems necessary to justify the valuation of £1,124,884 placed by the British concern on its holding of 241,807 shares of 500 lei each in the Roumanian company, which has not paid a dividend since 1926.

BRITISH Burmah Petroleum Company reported a decline from £124,935 to £44,111 in net profit for the twelve months to July 31 last, but the accounts show that but for the inclusion of £53,300 for profits on sale and conversion of investments, a loss would have been incurred on the year's working. Several factors contributed to the reduction in earnings. Productivity again declined in the Yenangyaung and Singu fields, "foreign" products competed at uneconomic prices with the company's kerosene, and increased taxation imposed a heavy burden on the oil industry in India. These adverse influences more than counteracted the working economies achieved by the management. No dividend on the company's shares is forthcoming for the past twelve months, against 5d. tax free per 8s. share in 1930–31, and although the sinking fund provision is maintained, nothing has been placed to reserve account. The company, however, remains in a strong financial condition, with a large excess of current assets over immediate liabilities.

CONSIDERABLE interest was aroused in the market by the announcement of the registration of Mosul Oil Fields, Limited, a private company with a nominal capital of £1,000,000 in £1 shares. The main object of the new concern is to acquire and hold shares in the B.O.D. (British Oil Development) Company, whose Iraq concession was described in the September issue of WORLD PETROLEUM. Like the Iraq Petroleum Company, B.O.D. is internationally owned, and the directors of Mosul Oil Fields consist of five British nationals, three Italian, one French and one German. According to its statutes, the company must remain British, with a British chairman. It is understood that the ordinary capital will continue to be held privately, but the market has been discussing the possibility of an issue of debenture stock or preference shares early this year.

BY DECLARING a dividend of 3½ percent for the year to June 30 last, the directors of Anglo-Ecuadorian Oilfields provided the market with a pleasant surprise. This company, which is an offshoot of Lobitos Oilfields, paid nothing for the preceding year. Economies initiated in 1930–31 were continued during the past financial year, and liberal allowance was made for depreciation, although this was smaller than before, owing to the properties having reached a more advanced stage of development. Net profit was £72,669 against a loss of £42,720 in 1930–31, and the accounts show that the company's finances have been considerably strengthened. At June 30 last it had 370 producing wells, an increase on the year of 38. Since the business is largely under the same control as Lobitos, it may be taken for granted that the policy under present world conditions will be conservation of the company's oil resources and finances, and that no effort to pay dividends has been made except as they are fully justified.

ALEC H. DAY

▼

New York: December

THE ACTION of the market in December was in sharp contrast to the results experienced in the same month of each of the three preceding years and seems to bear out the contention that stock prices have been thoroughly liquidated. In 1929, there was an average decline of 20 points in industrial shares in the first three weeks of December, while in 1930, a wave of liquidation running from the end of November to the middle of December carried the industrial average down approximately 33 points. In 1931, the last phase of the year's liquidation started on November 19 and was not completed until December 17, resulting in a decline of 43 points in the industrial average. In December 1932, however, the averages at the middle of the month were about four points higher than at the beginning of the month despite the wide publicity attending the war debts question, followed by defaults by France, Belgium and Poland. The virtual absence of tax selling, due to the revised provision of the 1932 revenue act as pertaining to security losses, probably played a part in keeping out a good deal of selling.

Default by France of the instalment due December 15, together with the collapse of the Herriot government as a result thereof, failed to disturb the equilibrium of the market, more consideration apparently being given to prompt payment by England despite the implied reservations. It is felt, however, that France will ultimately pay the instalment due last month, thereby placing herself on an equal basis with Great Britain in negotiations for a

New York Stock Prices

1932 High	1932 Low	Current Div. $ per Annum	Stock (Par Value $)	Nov. 21 to Dec. 17 Sales (Shares)	First	High	Low	Last	Net Change*
21⅞	8⅝	1.00	Atlantic Refining (25)	34,500	17	17⅜	15⅜	15¾	—1⅛
7	3⅜	....	Barnsdall 'A' (25)	21,800	4⅜	4¾	4⅛	4	— ½
1¼	¼	....	Colon Oil (No)	1,900	½	⅝	½	¼	— ¼
9	4	....	Consol. Oil (No)	90,900	6¼	6⅜	5½	5½	—1
9⅜	3⅝	....	Continental Oil (No)	32,500	6¼	6¼	5½	5⅝	— ⅜
3⅛	1¾	....	Creole Petroleum (No)	11,200	3	3	2⅝	2⅝	— ¼
44¾	23	....	Gulf Oil Corp. (25)	23,800	30½	31	27½	27½	—3½
55	35⅝	2.00	Humble Oil & Ref. (25)	5,500	45	46	43⅛	45	— ⅛
10⅞	6¼	0.50	Imperial Oil, Ltd. (No)	6,100	7⅛	7⅛	7¼	7⅝	— ⅜
2¾	1	....	Indian Refining (10)	2,800	1⅞	2	1⅞	1⅞	— ⅛
12¼	8	1.00	International Petr. (No.)	12,700	10¾	10¾	9¾	9⅞	— ⅝
11	5	0.40	Ohio Oil (No)	27,500	8⅛	8⅛	6⅝	6⅞	—1¼
14½	7¼	0.80	*Pan Amer. P. & T. 'B' (50)	1,700	12	12	11½	12	— ¼
8⅛	2	....	Phillips Petr. (No)	39,800	5⅞	6⅛	5	5	— ⅞
6½	2⅞	....	Pure Oil (25)	14,000	4⅛	4¼	3½	3½	— ½
1⅜	¼	....	Richfield Oil (No)	7,600	⅝	⅝	⅜	⅜	— ¼
23¾	12⅛	†0.81	Royal Dutch N. Y. (13⅓)	3,700	19½	20	18½	19¾	+ ⅝
20¼	6⅝	0.40	Seaboard Oil (No)	170,100	18⅜	20¼	17	18⅝	+ ⅛
8¾	2½	....	Shell Union (No)	22,300	6	6	5⅛	5¼	— ¾
5¾	2½	....	Skelly Oil (25)	8,200	4	4	3⅝	3¾	+ ¼
12¼	5¼	0.40	Socony-Vacuum (25)	90,100	8¾	8¾	7½	7⅝	—1⅛
31⅞	15⅛	2.00	Standard Oil of Calif. (No)	61,000	25⅞	26⅜	23½	24	—2
25⅛	13⅛	1.00	Standard Oil, Ind. (25)	123,600	22⅝	23⅝	21⅝	21¾	—1
16½	7	....	Standard Oil, Kansas (25)	16,300	12	15½	11⅝	15½	+3⅜
15⅞	8⅞	1.20	Standard Oil, Ky. (10)	11,300	11¾	11⅞	10½	10⅞	— ¾
37⅜	19⅞	§2.00	Standard Oil, N. J. (25)	110,500	31⅝	31⅞	28¾	29	—2⅜
39⅞	24¾	‡1.00	Sun Oil (No)	1,600	37½	37½	36	36½	—1½
18¼	9¼	1.00	Texas Corp. (25)	88,300	16	16½	13¼	13½	—2⅜
5⅜	2	....	Tide Water Assoc. (No)	17,700	4⅛	4⅛	3¼	3½	— ½
15⅜	8	1.00	Union Oil of Calif. (25)	6,900	11	11	9⅞	10	—1⅝
1¼	⅛	....	Venezuelan Petr. (5)	8,500	3/16	3/16	¼	¼	— 1/16

*Since close of last month's table. † Paid for 1931—no regular rate. § Including extras. * Ex Pan American Foreign. ‡ Also paid 3% in stock in 1932.

S&L

ALL CLASSES OF OIL COUNTRY TUBULAR GOODS TO A.P.I. AND OTHER STANDARDS

Sections of the twenty mile ten inch Victaulic oil pipe line supplied by Stewarts and Lloyds Ltd to Trinidad Leaseholds Ltd

STEWARTS AND LLOYDS LTD.

GLASGOW · BIRMINGHAM · LONDON

SOLE SALES AGENTS IN TRINIDAD FOR THE PRODUCTS OF THE VICTAULIC CO. LTD.

new debt settlement, which seems to be inevitable. Aside from war debts, the eyes of the country have been focused on Congress which has been struggling with measures designed to reduce the national deficit and lessen the widening margin between revenues and expenditures. Constructive legislation along these lines would prove most helpful in promoting economic recovery and it is hoped that Congress will submerge all other considerations and enact a program which will provide for real economy in government.

Oil shares showed a divergence from the market as a whole being influenced by weakening of the price structure for crude oil and gasoline. Since the beginning of November the mid-continent refinery price of gasoline had been steadily declining. The pressure from this source finally forced a restoration of a uniformly lower crude oil price structure and the $1.10 top price for crude was abandoned.

REPORTS from California by competent observers of the oil situation in that state are to the effect that the most important bidding for the assets of Richfield Oil Company remains in the future and that the real demand for the properties will become manifest in the next few months. In the opinion of these authorities Standard Oil Company of California and Consolidated Oil Corporation will be the real competitors for Richfield with Cities Service fading into the background and ultimately withdrawing entirely from the situation. A figure not far from $30,000,000 is set as the ultimate price which will be realized for the properties, which would represent an increase of some $4,000,000 over the highest bid submitted so far. Considerable progress has been made under the receivership in the working off of old oil inventories and the company in recent months has not held more than 100,000 bbl. at any one time and probably averages an inventory below that figure. It is estimated that on the basis of a purchase price of $30,000,000 the company would be able to earn 6½ percent on the invested capital.

ALTHOUGH Louisana Oil Refining Corporation made a somewhat better showing in the third quarter of 1932 as compared with the same period of last year, the company is still operating substantially in the red. A net loss of $356,366 after all charges was reported in comparison with a net loss of $233,800 in the preceding quarter and a deficit of $462,801 in the third quarter of 1931. For the nine months ended September 30, 1932, net loss equaled $1,418,162 as compared with net loss of $1,521,798 last year.

IN A PERIOD characterized by generally poor business conditions and financial difficulties for many corporations Continental Oil Company has recorded a real achievement in the reduction of its funded debt. From July 1, 1929, to the end of September, 1932, the company had reduced its outstanding funded indebtedness by over $26,000,000, leaving only $10,133,816 outstanding as of that date. Further reduction is understood to have been achieved in the final quarter. Debt reduction has been accomplished entirely out of income and cash resources without in any way impairing financial position. As a matter of fact current ratio was relatively stronger at the end of September than three years ago, current assets of $32,882,999 (including cash of $7,978,083) being 7.19 times current liabilities of $4,571,150, as compared with a current ratio of 5.8 to 1 on September 30, 1929. Whereas in 1929 interest and amortization of discount and expense on funded debt amounted to $1,886,146, the charges for this purpose in the first nine months of 1932 amounted to only $319,578. In addition to the savings effected in this direction Continental has also made substantial progress in reducing operating expenses through adjusting its operations to current economic conditions. Operating charges were reduced from $53,980,152 in the first nine months of 1930 to $32,-467,167 in the corresponding period of 1932.

DURING 1932 Sun Oil Company expended over $2,000,000 for increasing and perfecting its refineries while at the same time clearing away all of its bank loans. All of these expenditures were met out of current earnings. During 1931 its capital expenditures were approximately $6,000,000, and included improvements to its refineries at Marcus Hook, Pa., and Toledo, and to pipelines in the oil fields and in East Texas. The issuance of $4,000,000 of three year 5 percent notes on July 1, 1931 provided for the payment of bills and acceptances payable which amounted to $4,706,000. The company has had admitted to the list of the New York Stock Exchange 46,343 additional shares of common stock to provide for the payment of the 3 percent stock dividend which was disbursed on December 15.

AFTER a lapse of over two years Simms Petroleum Company declared a dividend of 25 cents a share, payable January 16 to stock of record December 30. In making the declaration the company stated that cash on hand was approximately $675,000, which exceeded the working capital required for operations. During the past two years the company has used surplus cash for purchase and retirement of its capital stock and since September 30, 1930, has reduced the amount outstanding by 340,481 shares at an average cost of about 5½. As a result of this policy the equity of the remaining shares in the company has been increased.

COLON Oil Corporation and the Colon Oil Development Co., Ltd., reported a net loss of $341,038 for the quarter ended September 30, 1932, after intangible drilling expenses, interest, depletion, depreciation and retirements.

ALTHOUGH reported earnings of Union Oil Company of California for the first nine months of 1932 failed to cover dividend requirements in the period, actual cash income revealed a very satisfactory coverage of the present dividend rate. Net income of $2,793,414 after all charges was equivalent to 64 cents a share as compared with a profit of $3,200,000, equal to 73 cents a share, in the corresponding period of 1931. Bookkeeping charges for depletion and depreciation, however, amounted to $5,337,258 equivalent to over $1.20 a share of outstanding stock. Cash and marketable securities on September 30 were equivalent to approximately $15,000,000 as compared with total liabilities of about $4,700,000, while total current assets amounted to over $50,000,000.

ACCORDING to a recent compilation companies formerly comprising the Standard Oil group distributed cash dividends amounting to $181,050,895 in 1932, a reduction of about 18 percent from the $220,739,182 paid in 1931.

C. C. BAILEY

▼

PURE Oil Company and Sun Oil Company are building an 80 mile pipeline from Toledo, Ohio, to Detroit, Michigan. The pipeline is designed to carry 12,000,-000 gallons of gasoline monthly from the companies' refineries at Toledo and will cost approximately $500,000.

DO AWAY WITH THAT OBJECTIONABLE ODOUR in your Turpentine Substitutes, Benzols, Solvents, by using

VIOFLOR

(REGD.)

Special Deodorising Compound

Full particulars on application

CREPIN & DOUMIN, LTD.,
15, COOPER'S ROW, LONDON, E.C.3.
Telegrams: DOVORIAN, FEN, LONDON. Telephone: ROYAL 2107.

HENRY L. DOHERTY & CO.
LIBRARY
60 WALL ST., N. Y.

NEW YORK • LONDON

WORLD PETROLEUM

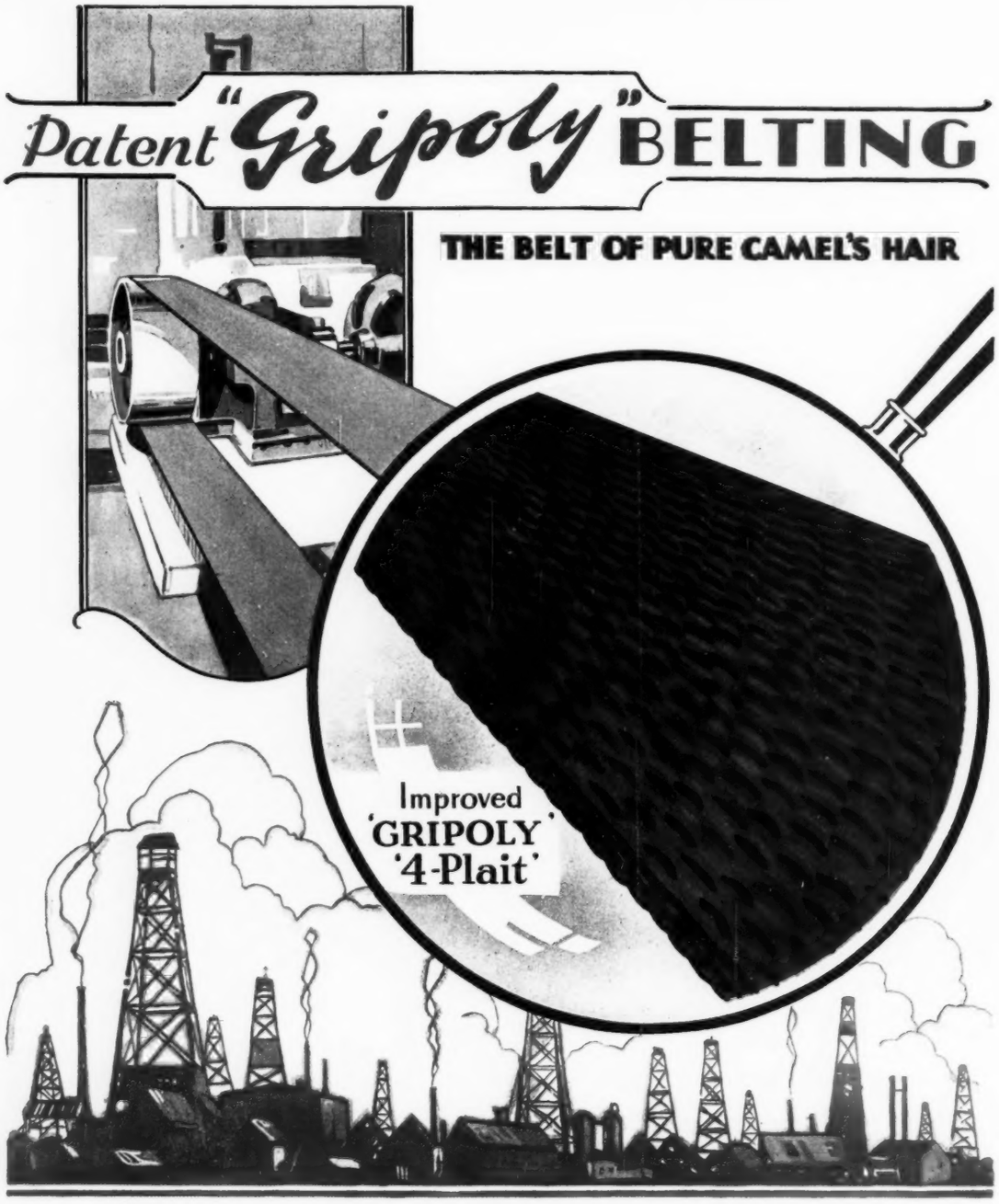
Official World Crude Oil Production Figures for 1932 • Road Users Fight Unfair Truck Legislation • Measuring Consumers Attitude • Sane Economics in Petroleum Marketing • Cosmic Genesis of Petroleum • Present Status in Roumania

FEBRUARY • 1933

FIFTY CENTS OR TWO SHILLINGS THE COPY

Patent "Gripoly" BELTING

THE BELT OF PURE CAMEL'S HAIR



THE SUPER BELT FOR OILFIELD WORK

Patentees & Sole Manufacturers:-

LEWIS & TYLOR LTD.,

9, St. Thomas' St., London, S. E. 1.

Works: GRIPOLY MILLS, CARDIFF.

FEBRUARY
1933

WORLD PETROLEUM

VOLUME IV — Editor, E. W. Mayo — NUMBER 2

CONTENTS

Frontispiece	38
Editorial	39
Production	47
Foreign Oil Legion	60
Finance	71

Special Articles

Road Users Fight Unfair Truck Legislation		41
Barco Development Begun		44
The Value of Consumer Geology	R. S. Nugent	45
Official World Crude Production for 1932		47
Sane Economics in Petroleum Marketing	H. S. Ashton	49
Present Status of Roumanian Industry	M. David Gould	52
Cosmic Genesis of Petroleum	Walter H. Jeffery	55
Background for Iraq Pipeline Construction		59

Published Monthly by

RUSSELL PALMER

153 Waverly Place, New York, U. S. A.

Telephone: CHelsea 2—7398 Cable Address: Ruspam New York

Great Britain: 110 Fenchurch St., E. C. 3, London

Telephone, Mon. 2650; Cable Address, Ruspam, London

Executive-Editor, T. Orchard Lisle

Advertising Manager, S. J. Gallay

▼

CALIFORNIA OFFICE: Bendix Bldg., Los Angeles.

Subscriptions

ANNUAL subscription to WORLD PETROLEUM is offered at the flat rate of five dollars (U. S.) postpaid to any country in the International Postal Union, except in Canada where a special tax compels the publisher to charge $5.60.

For the convenience of subscribers the publisher will accept payment in any of the following currencies at the fixed rate shown below:

Argentina	14 paper dollars
Canada	5.60 dollars
Colombia	5.25 peso (gold)
France	130 francs
Germany	21 Reichsmark
Great Britain	One guinea
Holland	12.50 gulden
India	14 rupees
Iraq	One guinea
Italy	100 lire
Japan	10.50 yen
Mexico	10.50 peso (gold)
Persia	100 cran
Peru	1.25 libra
Poland	45 sloty
Roumania	835 lei
Russia	1 chervonets
Venezuela	25 Bolivar

Remittances or drafts to the order of the Publisher, WORLD PETROLEUM, payable in New York and London.

Subscriber's name and address should be in Roman capitals on the subscription order.

Official position of subscriber is requested.

Advance notice, if possible, of a change of subscriber's address should be given. Effect cannot be given at once to a change of address. The period of transmission of the subscriber's instructions through the mail extends the time required before the magazine can be mailed to the new address.

▼

Agencies

SINGLE copies of WORLD PETROLEUM are obtainable every month, within the delay imposed by the international mail service, at any of the following agencies:

CABIMAS, VENEZUELA—The German Store
CARACAS, VENEZUELA—Casa Letcher, Torres a Madrices 22
MARACAIBO, VENEZUELA—High Life Tailors
THE HAGUE—Martinus Nijhoff, Lange Voorhout 9
LONDON—World Petroleum, 110 Fenchurch Street, E. C. 3
W. H. Smith & Sons, Ltd., Moorgate Met. Station
Willing & Co., Ltd., Moorgate Met. Station
NEW YORK—Telephone CHelsea 2-7398 for list of 20 newsstands carrying copies
PARIS—Librairie Brentano, 37 Avenue de l'Opéra
KOLN-LINDENTHAL, GERMANY—1 Laudahnstr: Director, A. J. Chambers
PORT OF SPAIN, TRINIDAD—Davidson & Todd, Ltd., 8 Frederick St.

The price of a single copy is 55 cents in Canada, 2 shillings in other countries of the British Commonwealth and the equivalent of 50 cents (U. S.) elsewhere.

▼

Particular Notices

CONTENTS of WORLD PETROLEUM are copyrighted by Russell Palmer, and contents may not be reproduced without permission.

Manuscripts and photographs submitted to the Editor are received only at the owner's risk. Prompt consideration will be given to them.

The Publisher does not necessarily endorse the views expressed by authors of signed articles. In the service of readers he will not hesitate to give publication to signed opinions in direct opposition to his own.

Advertising rates can be obtained on request.

One of the railroads' best customers **Will Connell**

NEW YORK • WORLD • LONDON

PETROLEUM

European Marketing Situation

EUROPEAN marketing conditions begin the year 1933 with an outward semblance of greater stability than they have shown for a long time past. Prices in the principal markets are on a basis where sellers at least are able to exchange an old sixpence for a new one, instead of being compelled as heretofore to accept a loss on every gallon of petrol sold. The Roumanian agreement, which came into operation on the first of the year, appears to be working satisfactorily. The differences of opinion between leading marketers in reference to certain price adjustments have been composed and the industry has adapted itself to the shift in trade currents caused by the American tariff on imported oil which came into effect in June last.

Although the effort to include Russia in an international trade agreement ended in failure at the conference held in New York in May of last year and has not been renewed since then Soviet oil is less seriously regarded as a menace to market stability than was the case a year ago. While the sales operations of the Souyousnefteexport have been carried into some new territories the share of its products in the distributing trade of the United Kingdom has decreased materially and the very fact that Soviet oil is being distributed over a wider area than heretofore makes it less disturbing to individual markets.

Probably the most important factor in bringing about a changed attitude toward Soviet oil on the part of other marketing interests is the realization that the progressive industrialization of Russia will require an increasing proportion of the total output to satisfy domestic needs and that the huge program of expansion originally included in the second five-year plan is not likely to be carried through in its entirety but must be modified in important particulars.

With Russia and Roumania no longer regarded as *foci* of trouble the one situation which is causing trepidation among distributors in Europe is that surrounding the price of crude oil and products in the United States. It is recognized that if the cuts recently made in American prices are carried further, and especially if a breakdown in the machinery of state regulation should result, it might become difficult if not impossible to maintain the price basis so laboriously established in Europe. Consequently the developments that take place from week to week in the American market are being watched with close attention throughout Europe in the hope that settled conditions may be established in time to prevent serious repercussions in the international markets.

Conservation and the Price Structure

IF APPREHENSION has been caused in international markets over the cuts in crude oil prices put into effect early in January in Texas and Oklahoma and spreading thence to other fields this feeling naturally has been intensified in the American trade, especially as these cuts have been followed by a reduction in motor fuel quotations and an outbreak of price cutting in various sections of the country. In many quarters it is being said that these recent developments are likely to bring in their train the final abandonment of efforts at conservation. While this result need not necessarily follow there is no use blinking the fact that the continued widespread production of crude in excess of established allowables will result in a complete breakdown of the machinery of regulation.

There is a disposition in certain quarters to blame the companies that are extensive buyers of crude for failure to hold up the price. Indeed the claim is often made that if the large integrated companies engaged in refining, transportation and marketing would only maintain a sufficiently high price for motor fuel and other products they could easily pay a rate for crude that would be entirely satisfactory to producers. The fallacy of this reasoning is obvious enough if it is followed to its logical conclusion. If the marketers of gasoline can maintain a price that will enable them to pay a dollar a barrel for crude there is no reason whatever why they should not double the price and pay two dollars. Producers would be even better satisfied, the refiners and marketers would make more money and the problems of the industry would all be solved.

Unfortunately the situation is not so simple as all this. No individual, no group, no government even, can abrogate the law of supply and demand. The most that can be done through regulation, restriction, agreement or proration is to prevent production from outstripping consumption and, by keeping the two in reasonable balance, to hold prices from descending to utterly ruinous levels.

The argument that the price of crude should be based upon the price of products puts the cart before the horse. The two should move in harmony but neither can be arbitrarily controlled. If crude is being overproduced constantly the excess, or at least the major portion of it, will find its way to market at whatever price may be obtainable, and the products made from this underpriced crude, by underselling the more expensive product, will narrow the demand for the latter and ultimately drive it from the field. This is what appears to have happened

in Texas and Oklahoma during the past few months. Competition from oil produced in excess of authorized quotas and necessarily sold below the market forced local refiners to cut the price of their products. The spread of this movement affected the larger refiners in turn and made it impossible for them to maintain the price levels that had been established. With gasoline selling in quantity over a broadening area at two cents a gallon or less as was the case in December and early January it was out of the question for the larger refiners to uphold a price basis of three or four cents a gallon or to pay for crude at a rate fixed upon such a basis. Their only recourse was to adjust their rates to competitive conditions.

Conservation laws and state control cannot do more than prevent, imperfectly at best, gross physical and economic waste. Proration is simply a dam erected to hold back the flood of crude from inundating and ruining the market. A certain amount of leakage in minute quantities seems to be inevitable and does not prevent the dam from serving its main purpose. If, however, cracks and fissures begin to appear in all parts of the structure and sizable streams begin gushing from these openings it requires no engineering expert to foresee the disintegration of the dam itself and the release on a career of destruction of the waters it has held back unless these breaches are promptly repaired.

Undoubtedly the best hope, indeed the only hope, for the ultimate success of conservation laws in preventing recurrent market upsets lies in a strong supporting local public sentiment. What is needed is to have this sentiment aroused and invigorated to a degree that will make the traffic in illegally produced oil too risky to be attractive and will hold accountable public officials who show laxness or indifference in the enforcement of regulations.

▼

Menace of Anti-Truck Legislation

WHEN the construction of railway lines was in its infancy there were violent protests at the introduction of this form of transport. These came in part from indignant citizens who objected to the dangerous innovation as a threat to life and limb, but in even greater volume from the operators of wagon trains, canal boats and stage coaches who saw their businesses endangered by the competition of steam. Legislative measures to curb the size and speed of railway trains were proposed in many states and cities and in a number of cases were enacted.

Now in the fullness of time the railways themselves, having become established and recognized institutions, have lapsed into the reactionary habit of their long forgotten opponents and are seeking by legislative aid to suppress the competition of newer forms of transportation that have been able to establish themselves in certain fields because of their demonstrated superiority in economy and efficiency. The position of the railway officials who are attempting through advocacy of restrictive laws to hamper the use of motor trucks upon the public highways is in fact more shortsighted than that of the stage coach operators and canal boat men who opposed the building of railway lines. The latter actually were threatened with the loss of their established means of livelihood. Truck transportation on the other hand, at the most liberal calculation, has drawn from the railways less than five percent of the business that could have been moved by rail under the most favorable conditions. Indeed there is abundant evidence, statistical and other, that the expanding use of motor trucks has brought more traffic to the railway lines than it has withdrawn from them. As is pointed out in a discussion of this subject which appears on other pages of this issue motor trucks transport no more than 4.7 percent of the total volume of traffic that could possibly be handled by the railways.

Viewed from any angle that may be selected it seems nothing short of ridiculous to attribute to this lowly competitor the losses in freight revenue that the railways have suffered in the past two or three years. A careful comparison will show that the shrinkage in railway tonnage has been about in proportion to the contraction of industrial activity within this period. For the most part the traffic they have lost is traffic that has gone out of existence, for the time being at least.

The fact that the agitation for discriminatory legislation against motor trucks is based upon a false interpretation of conditions does not warrant the neglect of organized and aggressive opposition on the part of those interests that will suffer by the adoption of such laws. The legislatures of 44 states of the American Union will be in session this year and from present indications nearly all of these bodies will be urged to adopt measures designed to add to the burdens of trucks operating either as private or common carriers and intended to drive a large proportion of them off the roads.

Bills to place a mileage tax upon such trucks, to limit their size and load to a wholly unjustifiable extent, to impose rigid regulation of rates and operating schedules and to abrogate the reciprocal arrangements by which trucks registered in one state are allowed free passage over the roadways of other states all indicate clearly enough that their purpose is not the ostensible one of providing sound regulation of highway traffic in the interests of the public safety and convenience but rather to make truck transportation so burdensome as to be unprofitable.

While the adoption of such legislation would work a tremendous injury to the operators of motor trucks, to the manufacturers of such vehicles and to the public at large it carries a double threat to the oil industry. The terms of many of the bills being pressed for adoption are such that they would prevent the employment of the large-sized tank wagons and trailers used by oil companies for the delivery of their products. More important still it would seriously curtail the demand for motor fuel through lessening the number of commercial vehicles in operation. The general enactment of laws such as those adopted last year in Texas and Kentucky would result in the loss of millions of dollars yearly to motor car manufacturers and petroleum companies.

Against the sane and reasonable regulation of motor trucks there is no opposition on the part of the highway users, the automotive manufacturers or the oil industry. A committee of the American Petroleum Institute, in conjunction with other technical bodies, has worked out a scientific system of specifications as to weight and load for each class of roads and vehicles. Based upon these requirements a scheme of regulation could be framed that would safeguard the highways and their users, insure the maintenance of reasonable rates and give the railways all the protection they are entitled to receive in the matter of truck competition. The bills now being pressed for passage in various states disregard these essentials and substitute for them expensive and discriminatory requirements.

In an effort to reach an amicable and fair agreement on this subject a joint committee representing the railways, the highway users, the motor vehicle manufacturers and the petroleum industry has been holding conferences for the past few months. A partial agreement as to the considerations that should govern the regulation of motor truck traffic has been reached. Such an understanding is important as contributing to fairer treatment in the future but it cannot stay the operation of forces already moving in many states for discriminatory truck legislation. The petroleum industry cannot afford to sit idly by and permit this new and unjust burden to be added to the many others that have been placed upon it. Its members should mobilize their forces and resist with all their strength this ill-advised effort to cripple their activities and through them strike a blow at the farmers, merchants and manufacturers who depend upon motor trucks for the prompt and efficient movement of their products.

Road Users Fight Unfair Truck Legislation

Measures Backed by Railroads to Cripple Commercial Use of Motor Vehicles Proposed in Many American States Contain Serious Threat to the Petroleum Industry.

LOOMING large in the field of current legislative activities a new and serious threat confronts the petroleum industry of the United States. The Legislatures of 44 states of the Union hold sessions this year and from present indications nearly all of them will be called upon to consider bills for the taxation, regulation and restriction of commercial motor vehicles operating upon the public highways.

This fact in itself is not necessarily disquieting. It is admitted even by those most directly concerned in the manufacture and operation of motor trucks that they should contribute in reasonable measure to highway maintenance and that some limitation on their size and weight should be imposed. The feature of the proposed legislation that gives cause for alarm is the purpose behind it. This is not merely the prevention of abuses and the preservation of equal rights to the use of public property. Apparently in the majority of cases and certainly in those that have attracted most widespread attention the object is clearly to impose such charges and restrictions upon commercial trucks that many of those now operating will be forced out of business and those remaining will be compelled to charge much higher rates than they do at present.

Stripped of all camouflage and pretense these bills are anti-truck measures. They are actively supported by the railways and in some cases are directly sponsored by railway interests. They serve notice that the big railway companies are out to get the humble highway competitor whom they hold responsible in large part for their loss of revenue during the past three years. That this is a mistaken view; that trucks actually have taken very little business from the rail lines and have, in fact, contributed more traffic than they have withdrawn, does not alter the practical situation now confronting the highway users of the country. Building upon the popular sympathy for the railways resulting from their loss in revenue and the consequent ill effect of their plight upon the finance and industry of the country, the railway interests are in a position to fasten upon the public drastic and unfair legislation in the guise of protecting the highways unless such measures are met by organized and determined opposition.

While the petroleum industry is directly affected by laws imposing needless and unjust restrictions upon motor trucks the matter is of equal importance to the operators of commercial vehicles, to motor car manufacturers and to commercial interests served by truck transportation. These interests are represented in an organization known as the National Highway Users' Conference which has taken up the task of resisting attempts at the enactment of inimical legislation. The recently appointed American Petroleum Industries Committee, acting for the oil industry, is cooperating in this movement. State and local organizations have been formed in a number of states where anti-truck legislation is being actively pushed. All the strength that these industries can muster is needed, however, to offset the influence of the railways which are well organized and powerful in practically every state of the Union.

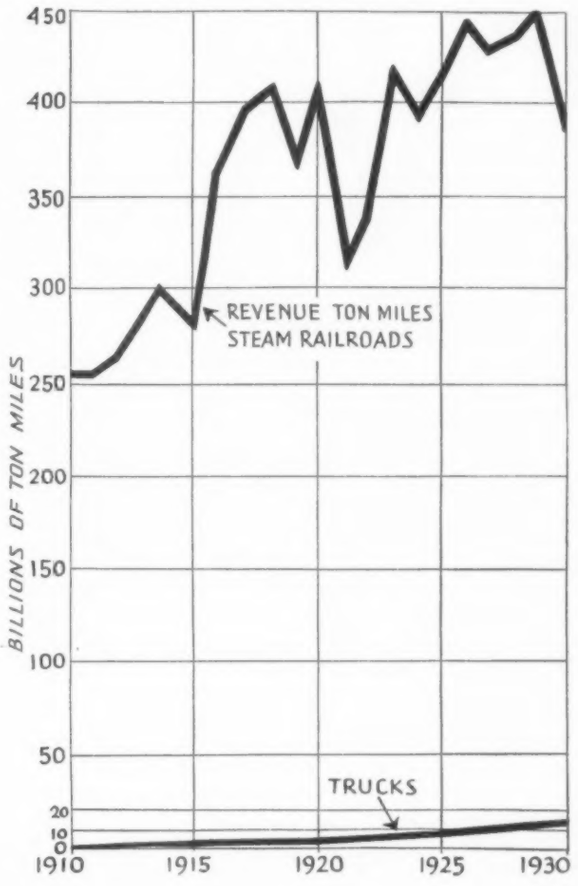
Texas Curtails State Income

ILLUSTRATIVE of the general character of the bills that are being pressed for adoption by the railways and their political allies is the law enacted last year by the Texas legislature. This measure limits the load that may be carried by a truck operating as a common carrier to 3½ tons while private trucks conveying loads to or from the railroads are permitted to carry double this amount.

Other provisions of the Texas law require compulsory insurance, the posting of a bond, permits to operate based on "convenience and necessity" and minimum rates equal to those charged by other common carriers. While these permits showing necessity and convenience are not in themselves harmful their effect on trucking depends on the spirit in which this phase of the law is administered. The provision relating to rates is obviously the one that is most helpful to the railroads in depriving Texans of cheap efficient truck transportation. The payload weight limit is doubled when trucks are hauling by the shortest route to or from a common carrier loading or receiving station. Length of single units is limited to 35 ft. and of trucks and trailers to 45 ft. Overall lengths may, however, be 55 ft. when hauling to railroads. Width is limited to eight feet and height with load to 12½ feet.

Results of this enactment are beginning to appear with the removal of an estimated 22,000 motor truck units from Texas roads. This represents the first step in the disintegration of an efficient road transportation system for citizens of Texas and will be followed, if relief is not forthcoming, by a greatly restricted employment of truck transportation in that state. The potential harm to the revenues of the state is indicated when the tax returns from both transportation systems are examined. Motor truck taxes alone equal more than twice the amount paid by the railroads operating in

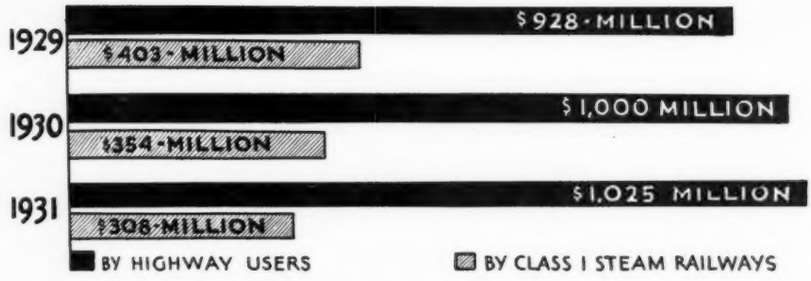
Revenue-producing freight carried by railroad compared to that carried by all commercial motor vehicles showing lack of relation between sharp loss of freight by railroads in 1929 and small steady increase in use of trucks.



Texas; total railroad taxes do not even equal the amount paid by commercial motor vehicles into the Texas school fund. When the railroads advanced the claim that trucking was handed its right-of-way without charge they overlooked or deliberately disregarded the fact that commercial motor vehicles paid during 1931 an amount in taxes equal to $861.48 per mile of highway against $447.00 per mile of line paid by Texas railroads.

Not only is there obvious discrimination in favor of the railroads in the Texas trucking law, but a campaign is now being planned to bring privately owned trucks under this law and to pass new laws further restricting trucks for hire. If this movement succeeds in driving the trucking business out of Texas the state will be deprived of the 16.52 percent of all state revenue now derived from commercial motor vehicles. Additional revenue to replace this shortage in the amount needed for schools and highways will have to be derived from higher motor fuel taxes resulting in decreased motor fuel consumption by passenger cars and progressively higher taxes to make up for dwindling revenues from this field of taxation. Eventually the tax will have to come from property owners when the burden becomes too great for a decreasing number of motor cars. Carefully conducted investigation reveals that Texas would be unable to maintain its present road system without the revenue derived from taxes on commercial vehicles. Extending or improving this system would be out of the question, while the increased taxes borne by passenger cars would rapidly decrease the number of these in use.

In view of the propaganda that has been carried on in Texas to cripple highway transportation it is interesting to note that railroads in Texas pay the smallest per mile tax of any state in the Union, amounting to only $447 per mile against an average of $1,219 per mile for the whole country.



Graphic illustration of the railroad's claim that they are overtaxed to compete with motorized transportation.

Inasmuch as a large proportion of the people of Texas derive their livelihood directly or indirectly from the production of petroleum, it seems particularly shortsighted for this state to lead a movement to curtail the consumption of one of its most important products.

The Supreme Court of the United States in a decision rendered December 5 upheld the Texas statute, declaring that a state has the right to free its highways from excessive, dangerous or inconvenient commercial traffic. Commercial traffic can hardly be regarded as excessive when figures indicate that there are only about 3,500,000 motor trucks in the United States in a total of some 26,000,000 motor vehicles. Ninety three percent of these trucks are of less than two tons capacity. Trucks cannot be considered dangerous when statistics show that from 1927 to 1931, while passenger car accidents increased 39 percent and passenger cars increased 10.5 percent, truck accidents *decreased* 19.3 percent while the number of trucks increased 18.9 percent. This would appear to be the natural result of using trained professional drivers for trucks while the majority of passenger vehicles are operated by amateurs. Trucks cannot be said to inconvenience the public when accurate estimates place their contribution to all special taxes at 29 percent of the total of approximately $1,258,000,000 collected by state and federal government, although trucks comprise less than 12 percent of the total number of motor vehicles. In addition to special taxes, trucks, of course, pay all the general taxes that other vehicles do.

Motor trucks form an essential auxiliary to rail transportation in modern distribution.

Pennsylvania's Coming Battle

FORCES to be adversely affected by strangulation of motor transport in Pennsylvania are rallying to defeat measures being advocated by another under-taxed rail system. In Pennsylvania railroads pay taxes far lower than those of neighboring states. Railroads in Pennsylvania pay $1,077 per mile against $9,162 per mile in New Jersey and $3,351 in New York. While not heavily taxed themselves the railroads are making a great outcry against the trucks which paid $16,226,000 to the state in 1931, in gasoline taxes and registration alone. The coming session of the state legislature will reveal whether Pennsylvania will follow Texas' footsteps in crippling this important source of revenue for the fancied benefit of the railroads. Pennsylvania already has taken one backward step inviting the ridicule of its neighbors by abrogating the reciprocal agreements by which states permit trucks with license plates of other states to use their highways. Pennsylvania requires all trucks using her highways to bear Pennsylvania markers as well as those of their own states. Further restrictions on truck operation and additional heavy taxes are proposed for adoption at the next legislative session.

National Association of Railroad and Public Utility Commissioners has drawn up a uniform motor carrier law which

it will attempt to have passed in all states whose legislatures are convening this year. This uniform law provides for a certificate of convenience and necessity, for a ton-mile tax to be decided by individual states and to be computed on twice the carrying capacity plus the truck weight, for a $30 per year tax on trucks up to five tons capacity plus $6 per ton for each additional ton capacity, and for the filing of rate schedules with the state authorities, no deviation from these rates being permitted. The uniform law would place all common, contract, and private carriers under the jurisdiction of the state authorities except farm trucks hauling farm produce and school buses.

Efforts have been under way for some time by the National Transportation Committee to work out a uniform basis for motor truck legislation through a conference of representatives of automotive, petroleum, shipping, and rail interests. A report is being prepared by the committee presenting its suggestions so far as these have been agreed upon.

Some Impartial Opinions

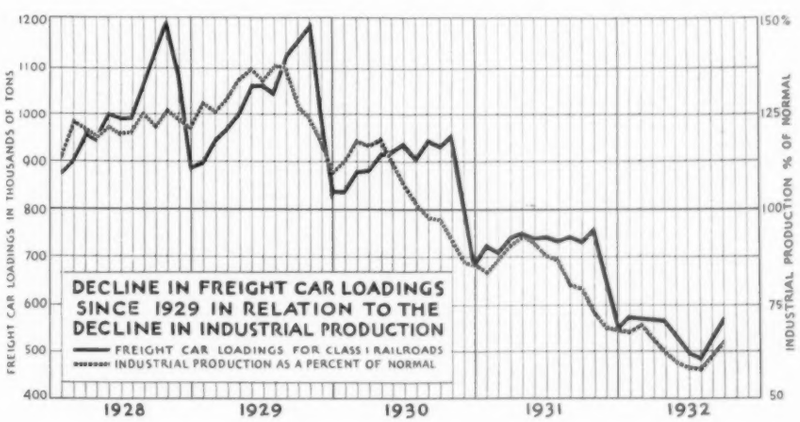
WHAT IS THE attitude of the country to the legislative demands for truck strangulation? Are those who will be affected awakening to the menace that may threaten the prosperity of a dozen different classes, labor, capital and industry in general without helping the railroads themselves? An editorial in the ST. LOUIS POST-DISPATCH points out that the aim of the railroads is to make all transportation as expensive as their own so that they can meet competition; that railroads already enjoy the advantage of being able to apply to the government for financial aid while trucks and buses must prove their right to exist on their own merits, and concludes by branding as unedifying the spectacle of the railroad, suffering like all business from economic conditions, beating its breast and crying for special consideration while other business is tightening its belt and resolving to meet conditions as best it can. An editorial from a New Jersey paper states that: "If the railroads cannot compete with motor trucks and buses on a basis of efficiency and service, the railroads are doomed just as the canal and covered wagon were before them." A Texas paper points out that trucks are already building their own right-of-way as the railroads suggest, indirectly through their heavy taxes used to expand road systems, the use of which is not, as in the case of railroad rights-of-way, confined to the use of the trucks.

A report of the Interstate Commerce Commission, whose special care the railroads are, finds that there are approximately 45,000 sizable communities in the United States without freight facilities furnished by rail. Motor transportation according to the Commission, has enabled these communities to contribute to the growth and industry of the country. Farms and agricultural regions have benefitted enormously from the spreading use of trucks on short hauls according to the I.C.C.

Finally, railroad men themselves, the more farsighted ones at least, see truck competition as of slight importance in attracting traffic away from the railroads. L. F. Loree, president of the Delaware and Hudson, suggests that as long as only six percent of trucks are common carriers subject to rate regulation this competition is so insignificant as to make the fight for its strict regulation hardly worth the effort. Daniel Willard, president of the Baltimore and Ohio, gives the general business decline, rather than truck competition, as the cause of freight loss. The Alexander Hamilton Institute states: "If motor truck transportation were eliminated entirely and the railroads were able to add all the motor truck freight to the present volume of railroad freight, the railroads would not benefit materially." In fact, the greater part of the freight lost by the railroads in recent years has been lost entirely and is no longer being transported by any system. Truck freight that might be carried by rail amounts to not over 4½ percent of the volume of rail freight, while recovery of freight formerly carried by rail that has ceased to exist since 1929 would increase volume of rail freight 90.7 percent. Of the 4½ percent of traffic carried by trucks in possible competition with railways only a very small part would go to the rail lines if trucks were eliminated. It is now transported by truck because of the low cost of such transportation. If trucks were put out of business most of this freight would cease to avail itself of transportation because the additional cost would make transportation prohibitive. In addition it should be taken into account that the railroads would lose the freight now carried for the trucking industry. As 12.6 percent of all carload freight originates in the automotive and petroleum industries, it is obvious that elimination of trucks would bring about a sharp decrease in the demand for railroad services. Deprived of field to rail head facilities the railroads would lose much agricultural freight. In short, if railroads succeeded in killing truck competition entirely, they might very well find that they had decreased rather than increased the freight available for rail transportation.

After Trucks—Automobiles?

WHILE THE railroad attack thus far has been directed chiefly against motor trucks, probably because truck operators are looked upon as having little political influence, there is no reason to believe that the campaign, if successful, will stop here. While statistics of goods transportation show that very little of this class of traffic has been transferred from the rail lines to trucks there is evidence that a substantial loss of passenger traffic has been experienced by the railway lines, some part of it going to motor buses but more to privately owned motor cars. A next logical step on the part of the railroads would be a demand for additional restrictions and increased taxation on all classes of passenger vehicles. In fact, a tendency in this direction is already noticeable in proposals to deny automobiles the right to travel in a state unless they bear the registration markers of that state. To the thousands of families who travel all over the country, pleasantly and economically, in motor cars, this would be a serious measure, restricting them to one or at most two or three states. It is a step in the direction of breaking up the economic unity of the United States which



has been a recognized advantage in building up the present high standard of living.

In contrast to the selfish and short-sighted policy of the railways in trying to prevent the development of a means of transportation that has definite economic advantages for certain classes of traffic is the position taken by the National Highway Users Conference, the automotive industry and the American Petroleum Institute in favor of a sane and reasonable regulation of truck operation upon the public highways. In conjunction with the Society of Automotive Engineers the Institute has worked out model restrictions on the size and weight of trucks that promote the conservation of the roads and safety in their use. These regulations safeguard the public's interest; anything beyond can find support only in the desire to give the railways an unfair advantage.

The Hoover Code, A.P.I., S.A.E., and American Association of State Highway Officials agree that trucks should not exceed eight feet in width with an allowance of six inches for bulging pneumatic tires. A.P.I., S.A.E., and A.A.S.H.O. agree that trucks should not exceed 12½ ft. in height while the Hoover code places maximum height at 12 ft. In length the same three bodies agree that single units should not exceed 35 ft. while the Hoover code places maximum length at 33 ft. For combinations of units the Hoover code suggest 85 ft., the A.P.I., 65 ft., the S.A.E., 45 ft. on roadways 20 ft. or less in width or 65 ft. on broader highways. The A.A.S.H.O. gives the maximum length of combinations of units on any highway as 45 ft.

Weight is determined by the type of roadway on which the truck is to be used and varies slightly with the different codes but the A.P.I. suggests axle weights ranging from 24,000 lbs. on metropolitan streets, 20,000 lbs. on industrial roads, and 18,000 lbs. on agricultural roads, for trucks equipped with balloon tires, to 17,920 lbs. on metropolitan, 14,400 lbs. on industrial, and 12,800 lbs. on agricultural roads for trucks equipped with solid tires.

It is noteworthy, however, that the number of trucks equipped with solid tires has decreased from 29 percent in 1921 to three percent in 1931 and the three percent manufactured in 1931 are probably largely used in cities or on trucks that do not use state highways. It is also important to note that after scientific investigation the U. S. Bureau of Public Roads stated that: "Any highway built to withstand the elements is not damaged by trucks having gross weight limited to 9,000 lbs. per wheel," thus laying the old ghost of excessive damage to highways by trucks.

With the model restrictions offered by the A.P.I., the petroleum industry is in a position to judge whether proposed bills are designed to crush railroad competition or to protect the public and highway users. In view of the fact that almost all states have at present adequate laws safeguarding the rights and comforts of highway users in regard to trucks it may be assumed that by far the greater part of the legislation coming up at present is rail-inspired.

Adequate publicity on the part of oil companies and employment of some of the same tactics that have been partially successful in opposing tax diversion and evasion should be the industry's contribution to the fight that is just beginning.

It is apparent that the public is in a mood to revolt against unduly high taxes and tax diversion. In Maine, the September election killed the proposed increase in gasoline tax by an overwhelming majority. In Missouri, voters have limited the gas tax to two cents for ten years. In North Dakota, an increase was defeated by a referendum. Such successes, of which these are only a few examples, should encourage the industry to enter the battle with the railroads with good hope of defeating at least the worst of the proposed bills. If the facts are placed before the public it can be relied upon to oppose discriminatory legislation.

Obviously, from a long term view, advances in transportation methods cannot be restrained. The railroads will give place to trucks and airplanes if the latter demonstrate their economic superiority just as wagon trains gave place to railroads and sailing ships to steamboats. But powerful and well-organized lobbies with the support of labor and financial interests can cause serious temporary injury. If the railroads persist in their present endeavor to handicap other forms of transportation they may succeed in delaying the return to normal business conditions. Faced with an opposition that, according to Senator Couzens speaking from the Senate floor, killed a just and equitable bill for the regulation of commercial motor vehicles by moving for resubmission, the petroleum and automotive industries will need all the force they can muster to succeed in assuring themselves just treatment at the hands of state legislatures, many of them inclined to do the railroads' bidding.

▼

Barco Development Begun

EARLY in February drilling operations will be begun by the Colombian Petroleum Company in the territory covered by the Barco Concession in Colombia. Although it is now more than 25 years since this concession was originally granted to Don Virgilio Barco development of the property has been delayed from one cause or another, more recently because of the action brought in the Colombian courts to abrogate the grant because of alleged noncompliance with the terms of the original agreement.

All these difficulties were finally disposed of last year with full recognition of the company's rights and preparations for the commencement of drilling were put under way immediately. To assemble the necessary equipment on the ground was a slow and tedious undertaking since it had to be floated in at a time when the water was high enough in the rivers to permit the passage of fairly heavy boats. This part of the work was finally completed in the latter part of 1932, the only untoward incident being the capsizing of one barge in Lake Maracaibo with the loss of its load of equipment which, however, the company expects to recover. Other work such as the construction of camps has been carried forward and a field force has been on the ground for some weeks. The drilling crew which is to put down the first wells is due to arrive on the scene about February 1.

On account of the difficulty of providing a satisfactory fuel supply the first well will be put down by gasoline drive, the needed quantity of gasoline having been conveyed to the field in tanks along with the drilling equipment. It is expected that this well can be carried to a depth sufficient to supply the oil needed to put down others which will be drilled to a greater depth. Before the end of the year the second well will be completed according to present plans and early in 1934 a third one will be drilled.

Majority control of the Colombian Petroleum Company rests with the Gulf Oil Corporation of Pennsylvania and its field operations are conducted through a subsidiary known as Compania Colombiana del Petroleo.

The Value of Consumer Geology

The Need for Accurate Data on Preferences and Prejudices of the Consumer of Oil Products and How This May Be Obtained is Outlined in the Accompanying Article by R. S. Nugent.*

ACHIEVEMENTS of the oil industry in developing ultra modern methods of production are well known. Fortunes have been spent in physical research; refining methods are constantly being improved. There can be little question of the comparative value or efficiency of new methods in the field of production, because costs and results may be definitely and objectively measured, in terms of dollars, barrels, gallons, hours, and other units which are understood. Gasolines and oils produced by different methods or from different crudes may be compared in terms of octane rating or viscosity. These are all units of measurement which are well defined. They mean substantially the same things to all men who deal with them.

Measurement of achievements in the field of selling offers a marked contrast. This is because the forces which operate to cause the public to buy one brand in preference to another, or to buy any brand at all, are not nicely defined as are the laws of physics and chemistry. Millions of dollars are spent in advertising and in giving superior service to the motorist. Advertisements carrying fine art work and carefully prepared copy appear in the magazines and newspapers. This copy is designed to give the public certain beliefs or attitudes about a product, because these beliefs and attitudes are supposed to result in purchases of that product. Expensive service stations with uniformed attendants, fine rest rooms and pleasant surroundings are provided to attract trade and create good-will. And, to a very large extent, the relative values of these different forms of selling effort are unknown. A sample of crude oil may be analyzed in ten different laboratories and the results will agree because scientific methods of analysis are available. Ten advertising men may be asked to select the best sales appeal from a number of suggested campaigns and wide disagreement will result.

If selling and distribution are to keep pace with production more exact laboratory methods must be used in studying the forces behind the purchase of a tank of gasoline. One motorist will drive up to the nearest pump. The next will risk running out of gas as he drives past station after station in search of one that sells his favorite brand. And in doing so he may pass a third car looking for just the brand of gasoline that he has refused to buy. What are the beliefs, experiences, and attitudes that make these motorists so different? Application of scientific methods of analysis to the problem can give the answer and will point the way to more effective use of advertising and sales appropriations. Guesswork in such matters is tremendously expensive.

There can be no question that price is an important factor in sales, yet fifteen cent and thirty-five cent oils are sold within a single block to drivers of identical makes of cars. There are many motorists who must economize in these times; some of them buy cheap bootleg gas while others continue to pay for a premium product. Why the difference? The man who is willing to buy the better product does so because of certain ideas about it, and the manufacturer of this product would do well to discover what these ideas are. We read in the advertisements that one oil flows at low temperatures, that another is mellowed for millions of years, that another is "crack-proof," that another is made from some particular kind of crude, and that another leads in sales. They are all fine advertising appeals if the motorist reads and believes them, and IF he buys the advertised brand as a result of this belief. All that is needed to complete the picture is the use of an accurate device for identification of the best appeals and measurement of their results. Until this is done the man who talks loudest will have his way, for his guess is as good as the next.

It would be wonderful to say here that research methods exist which would put sales and distribution on a scientific par with the chemical and physical research of production. If they do, the writer has never heard of them. Yet much progress has been made in psychological research and for a number of years a large organization of specialists has applied the methods of psychology to the analysis of selling problems.

This unique organization has called its work "The Measurement of Attitudes." It is a type that is as yet little known, but which is rapidly assuming an important place in the conduct of business. Its techniques are applicable to the problems of almost any company whose products or services are sold to the general public. As evidence of the practicability of the method and the diversification of its ap-

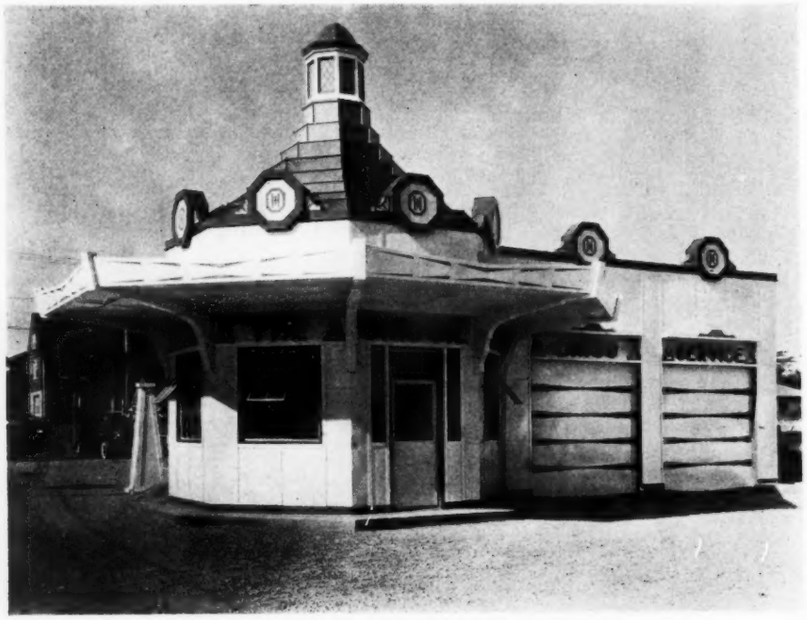
Here is where the oil company meets the consumer. This modern service station with enameled steel walls is kept perfectly clean by soap and water washing.

*Associated with J. David Houser.

plication, a few typical cases in various fields of merchandising may be mentioned.

A leading manufacturer of electrical goods, ranging from electric irons to power house equipment, conducted an investigation through this organization to have his institutional advertising and radio programs evaluated as a basis for future policy.

A department store executive uses this means to determine the reasons for distribution of patronage by departments within the store and to learn the truth concerning the motives for the shifting of favor from one store to another. A most interesting problem was provided in the study of women's habits in the purchase of yard goods rather than ready-to-wear dresses, the findings forming the basis for a more intelligent approach to the consumer and the consequent continued success of the department in question.



What effect has this modernistic service station on the buying habits of consumers?

Advertising appeal most likely to influence purchase of a certain cosmetic was disclosed before any effort was made to exploit the product. Success was instantaneous, and of a permanent character.

Many notable utilities have used the services of this organization repeatedly for sales and advertising guidance, for improvement of their public relations, and as a basis for policies affecting legislative and financial aspects of their management.

In gathering data for these studies nearly a million people in all parts of the country have been interviewed.

Careful definition of the problems for study comes first, then construction of a questionnaire designed to bring to light the knowledge, habits, beliefs and prejudices of the persons to be interviewed, then the actual gathering of the data by trained interviewers, and finally, careful analysis of the material gathered. The exploring of the customer's mind cannot be conducted in a casual fashion.

Misleading information will result from any naïve approach which simply asks, "Why do you buy this brand?" People just can't tell. The man who says that advertising is all bunk which cannot influence him may wear advertised brands of clothes, smoke highly advertised cigars, brush his teeth with a branded toothbrush and even prefer a branded orange or grapefruit. He is influenced but he doesn't know it, or won't admit it. More subtle methods are necessary, and it is the development of these methods that has earned this type of research a place in modern business.

Nor is it sufficient to know how many people believe one thing or know another. In a study made for a public utility it was found that equal numbers of people objected to the cost of illuminating gas and to the dangers of asphyxiation or explosions. With only this much information the natural reaction might be to appropriate equal amounts to combat these beliefs through advertising. However, complete analysis showed that people who objected to the cost of gas bought just about as much as those who did not, while the monthly bills of those who thought gas dangerous were far below average. One belief made no difference to sales. The other did. So there are two questions: "What is the public attitude?" and "What is the relative importance of various aspects of public attitude in causing the public to buy the thing which you have for sale?" Both must be answered.

There are many questions which it is important for the marketing heads of oil companies to answer but which they cannot answer today. A few of these are suggested herewith:

- What reasons are given for oil preferences by drivers who insist on their favorite brand?
- What are the habits of motorists with regard to continued patronage of one service station or filling station?
- What is the economic status of the best dollar customer of gas and oil?
- What price cars do these owners drive?
- When oil is purchased in cans from sources other than garages and regular filling stations necessitating self-service, what effect does this have on gasoline purchases?
- Does the average car owner prefer to buy tires and accessories at the car dealer's, or at the neighborhood service station of an established oil company handling these products, or at general garage accessory shops?
- Does it pay to build glorified service stations? How much is the mail order lube business affecting station sales?
- How critical is the need for so packaging their oils that manufacturers can control their brands from the refinery to the crank case?
- What percentage of the decline in lube sales is due to dealer substitution of crank case drainage?

The answer to every one of these and other questions can be determined through sane consumer analysis.

They cannot be determined by a study made from inside the organization where unconscious prejudice for the investigator's own product is bound to color his conclusion.

When sound analytical methods are intelligently employed in connection with the problems which executives of the oil industry are facing, science will have supplanted much of the guesswork now currently used in connection with such topics as the tendency toward the use of cheaper motor oils, all phases of filling station operation, influence of car dealer recommendations on future purchases, the matter of division of brand preferences affecting fuel and oil, the car owners' knowledge of the effect of inferior lubrication, crankcase draining and the effectiveness of different advertising approaches. The information needed can be found only in the minds of the consuming public; it is there ready to be tapped by the alert executive who is weary of trial and error procedures.

World Oil Production—Official Figures for 1932

All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. Barrels—Conversion ratio 7 bbl. = 1 ton)

Country	January 1932	February 1932	March 1932	April 1932	May 1932	June 1932	July 1932	August 1932	September 1932	October 1932	November 1932	December 1932	Total 1932	Daily Average 1932
United States	66,884,000	62,484,000	67,189,000	67,717,000	68,523,000	64,835,000	66,310,000	66,220,000	65,036,000	65,219,000	63,384,000	58,864,000[1]	782,665,000	2,138,429
Russia	13,059,900	12,194,000	13,852,300	13,101,200	13,437,200	12,971,700	12,923,400	12,721,800	11,598,300	11,928,700	11,022,900	10,908,100	149,719,500	409,070
Venezuela	9,939,027	9,469,873	10,398,514	10,870,615	11,219,908	11,151,490	9,822,428	9,562,777	9,080,050	9,392,894	9,003,428	8,724,667	118,635,671	324,141
Roumania	3,780,000	3,439,100	3,621,170	3,557,470	3,748,710	3,745,238	4,289,327	4,868,801	4,166,568	5,236,870	4,997,951	5,040,000[1]	50,491,205	137,954
Persia[2]	3,325,000	2,814,000	3,738,000	3,451,000	3,773,000	3,913,000	4,543,000	4,116,000	4,011,021	3,982,132	3,816,771	3,639,531	45,122,455	123,285
Mexico	2,869,177	2,761,064	2,967,842	2,922,309	2,926,574	2,701,184	2,505,879	2,462,961	2,513,673	2,569,359	2,632,862	2,969,201	32,802,285	89,624
Dutch East Indies	3,943,147	3,652,432	2,844,065	2,923,382	2,865,261	2,963,350	3,185,252	3,216,899	3,492,903	4,551,595	2,888,620	3,057,121	39,584,027	108,153
Colombia	1,533,969	1,401,554	1,668,508	1,655,922	1,682,223	1,627,377	1,455,599	1,444,432	1,374,006	871,510	734,845	935,011	16,384,956	44,768
Argentina	1,116,800	1,040,000	1,192,700	1,078,500	1,057,200	1,001,000	1,067,000	1,019,400	1,031,600	1,210,400	1,233,400	1,118,900	13,166,900	35,975
Peru	945,231	750,804	697,622	732,308	951,112	972,890	830,986	819,772	749,209	753,741	754,142	941,449	9,899,266	26,026
Trinidad	846,878	828,860	874,145	852,080	859,609	839,248	883,102	754,301	840,981	850,281	785,155	809,140	10,023,780	27,387
British India	750,251	698,645	719,337	681,942	739,570	672,613	750,793	795,954	527,759	700,000[1]	700,000[1]	700,000	8,436,864	23,051
Poland	351,365	324,100	334,495	336,231	340,200	336,000	351,603	345,408	185,500	327,194	332,262	340,872	3,905,230	10,670
Sarawak	210,748	200,102	197,050	191,282	187,859	177,023	195,188	192,293	187,397	189,315	175,567	170,219[1]	2,274,043	6,213
Japan and Taiwan[1]	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	195,000	2,340,000	6,393
Egypt	138,796	137,431	142,275	151,305	146,489	152,712	159,208	163,093	147,581	140,973	135,758	126,749[1]	1,742,370	4,760
Ecuador	126,406	111,361	126,024	133,844	139,389	137,437	143,010	135,063	128,698	134,809	127,372	130,444	1,573,857	4,300
Canada	96,912	90,841	97,484	95,585	95,221	89,533	86,969	85,229	79,813	78,845	77,107	80,834	1,054,373	2,880
Germany[3]	148,197	150,197	262,528	141,780	150,000[1]	150,000[1]	150,000[1]	139,909[1]	129,633[1]	141,351[1]	130,424[1]	130,000	1,824,019	4,983
Iraq[1]	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,200,000	3,278
France	46,000[1]	46,000[1]	46,000	46,000	46,000[1]	46,000[1]	46,000[1]	46,000[1]	46,000	46,000[1]	46,000[1]	46,000	552,000	1,508
Others[1]	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	36,000	432,000	1,180
	110,442,804	102,925,364	111,300,059	110,970,755	113,219,525	108,813,795	110,029,744	109,441,092	105,657,692	108,656,169	103,309,564	99,063,238	1,293,829,801	3,534,028

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] Including Thuringia. Sakhalin (Russian) included with Russia. Sakhalin (Japanese) included with Japan.

OFFICIAL figures cabled to WORLD PETROLEUM by Governments of the various oil producing countries reveal that curtailment efforts in 1932 resulted in a drop of 61,555,711 bbl. in world oil production as compared with 1931.

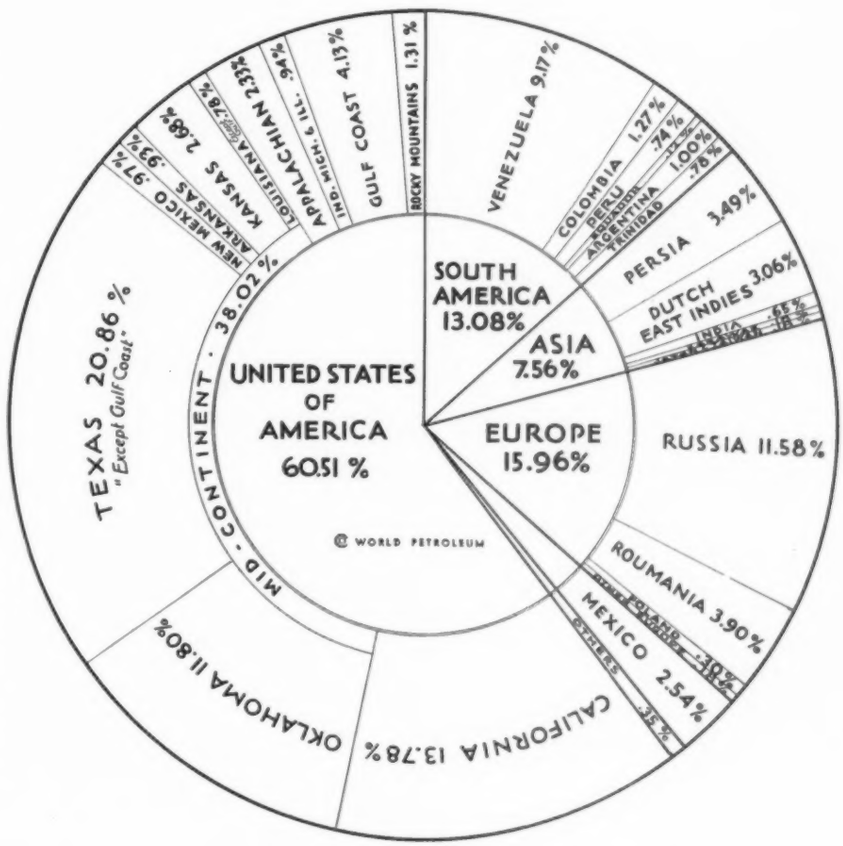
World Crude Oil Production — Official Figures for 1932.

In U. S. Barrels, Converted at 7 bbl. per Ton Where Government Returns Are Issued In Tons or Metric Tons.

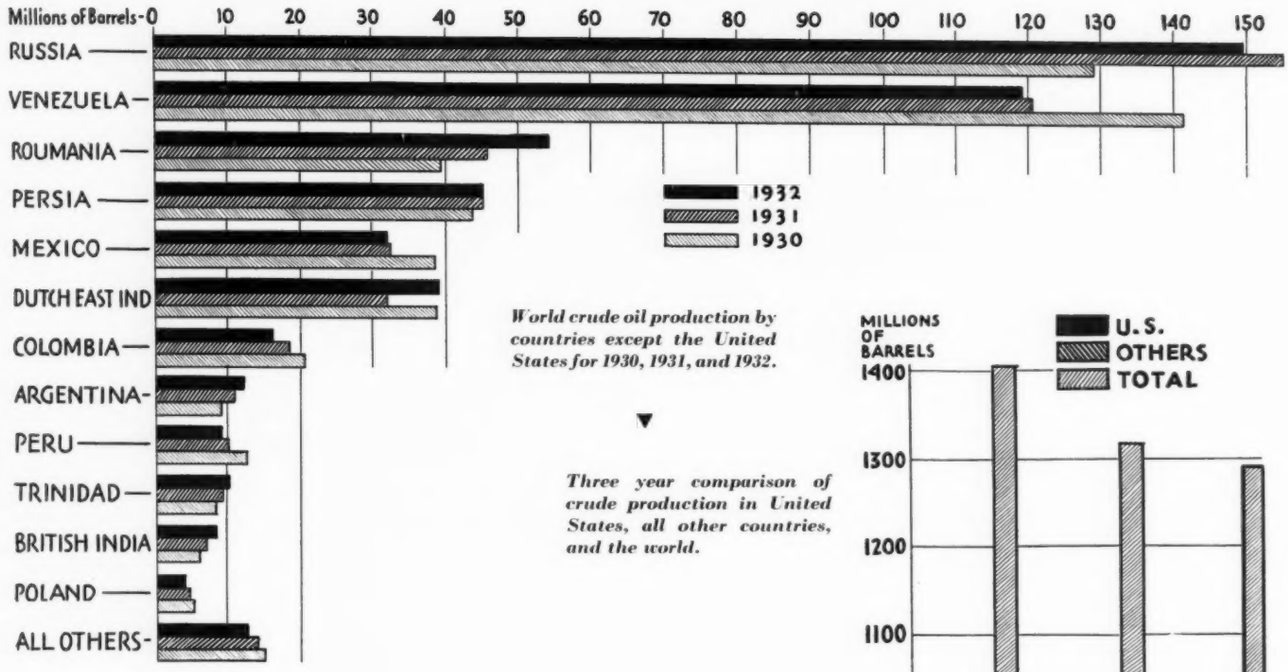
Country	1932	1931
United States	782,665,000	850,275,000
Russia	149,719,500	156,342,900
Venezuela	118,635,671	120,069,462
Roumania	50,491,205	46,333,945
Persia*	45,122,455	40,253,486
Mexico	32,802,285	33,038,853
Dutch East Indies	39,584,027	32,818,346
Colombia	16,384,956	18,237,190
Argentina	13,166,900	11,709,759
Peru	9,899,266	10,102,116
Trinidad	10,023,780	9,743,763
British India	8,436,864	7,830,101
Poland	3,905,230	4,397,760
Sarawak	2,274,043	3,338,472
Japan and Taiwan[1]	2,340,000	1,884,285
Egypt	1,742,370	1,845,938
Ecuador	1,573,857	1,750,633
Canada	1,054,373	1,583,339
Germany	1,824,019	1,778,602
Iraq	1,200,000	1,200,000
France	552,000	512,862
Others	432,000	338,700
Total	1,293,829,801	1,355,385,512

1932	1931
United States 782,665,000	United States 850,275,000
All Others...511,164,801	All Others....505,110,512

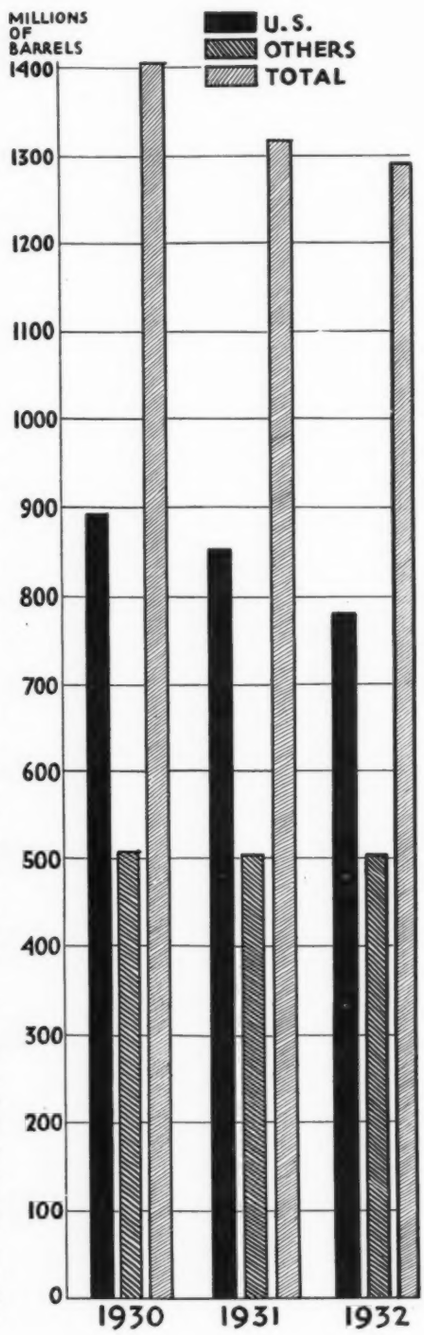
* Anglo-Persian Oil Co., Figures.



Analysis of world's crude oil production for 1932: 1,293,829,801 bbl. converted on the basis of 1 ton = 7 bbl.



World crude oil production by countries except the United States for 1930, 1931, and 1932.



Three year comparison of crude production in United States, all other countries, and the world.

This curtailment of production was entirely the result of efforts in the United States as production in that country decreased from 850,275,000 bbl. in 1931 to 782,665,000 bbl. in 1932 while production in all other countries increased slightly from 505,110,512 in 1931 to 511,164,801 bbl. in 1932.

United States production not only decreased in quantity but also in its relative position to the rest of the world. While U. S. production represented slightly over 62 percent of world production in 1931, in 1932 it had decreased to 60.51 percent.

The second greatest reduction in production was entirely involuntary and occurred in Russia, amounting to 6,623,400 bbl. In spite of ambitious plans for greatly increased production the Soviet Union actually produced only 149,719,500 bbl. in 1932 against 156,342,900 bbl. in 1931. In accordance with her economic plan no curtailment was contemplated in Russia for 1932 but lack of equipment and disorganization of personnel resulted in a decrease.

Venezuela, in accordance with the conservative policy of the large companies controlling the oilfields in that country, continued to reduce production moderately during 1932. Total output for last year amounted to 118,635,671 bbl. against 120,069,462 bbl. in 1931, a reduction of 1,433,791 bbl. An important factor in the Venezuelan situation during 1932 was the enactment by the United States of an excise tax on petroleum imports. This necessitated some readjustment in the direction of shipments by major companies operating both in the United States and Venezuela. United States production was used to supply the domestic market instead of being exported while Venezuelan crude was refined outside the United States and used to replace petroleum formerly exported from that country.

Roumania, storm center of the oil industry during the past year, increased her production by 4,157,260 bbl. from 46,333,945 bbl. in 1931 to 50,491,205 bbl. in 1932. During the second half of the past year international oil interests have made every effort to stabilize Roumanian production and an agreement was concluded late in the year by which it is hoped that Roumanian production will be held around the present figure or slightly lower except as domestic consumption increases.

Production in Persia and Mexico remained about the same for both years. Figures for Persian production reproduced herewith are those supplied by the Anglo Persian Company and are subject to revision at a later date as part of the oil produced is returned to the ground in the form of fuel oil. Dutch East Indies and Colombia decreased production while Argentina pursuing her policy of national economic independence increased hers. Figures for Germany are not complete in this analysis as production in Thuringia for the latter part of 1932 are not official.

Sane Economics in Petroleum Marketing

H. T. Ashton, President, Lubrite Refining Corporation, Sees the Need for Leadership in Establishing Retail Prices in Relation to Competitive Wholesale Prices for Gasoline.

THE GREAT scope of this subject, involving products, policies, profits and a host of other factors, would require a considerable time for cataloging and interpretation. The problem has received constantly increasing analytical thought by many members of our industry, as it has come to be recognized that the retail price of petroleum products constitutes the weather-vane of profit for the entire industry.

It might well be said that the retail marketing of gasoline and lubricating oil in the United States truly reflects the combination of economic forces at work both internal and external to the petroleum industry.

For the purpose of this discussion, and in order to simplify our conclusions, the marketing of gasoline through retail outlets will be considered the prime factor.

The growing pains which have attended the tremendous development in the retail marketing of gasoline during the past decade are common knowledge, not only from the actual evidence apparent on every highway and many by-ways, but from the public statements of those in the industry who were aware of incorrect business tendencies and economic fallacies.

The general and intensive thinking which has been applied to the marketing situation, resulting in conclusions both remedial and otherwise, makes it difficult to present any new phase for critical consideration, or to formulate possible corrective measures which have not previously been suggested. Your indulgence, therefore, is requested if some repetition occurs, and the analysis and conclusions which follow are offered not as a result of original thinking, but rather as a compendium of obvious facts and trends, and the normal deductions therefrom.

The Problem Forming

THE FIRST service stations in this country are within the memory of most of us. Beginning some 20 years ago and continuing until the recent past, we have witnessed the unparalleled development of the motor vehicle, accompanied by like development in the production of crude oil and of gasoline.

While crude oil production was mounting rapidly from year to year, due to improvements in the methods of discovery and of production, a steady increase in efficiency accompanied the refining art, bringing annual gains in both the yields and quality of gasoline.

It is interesting to note the relative production of crude oil and of gasoline in recent years which shows an increase in crude production from 1920 through 1931 of 90 percent; while the increase in gasoline production over the same period is 256 percent.

The increase in gasoline production was matched by a somewhat similar increase in gasoline consumption and a steady annual increase in the number of registered motor vehicles and the building of improved highways.

In comparing this data for the period from 1920 through 1931, it is noted that hard roads increased 147 percent, motor vehicle registration increased 180 percent, and gasoline consumption increased 274 percent.

Through the availability of improved roadways, the general use of the closed car, and the development of trucking routes, there followed an increased annual consumption of gasoline per vehicle.

Market Derangement

NOT LONG ago there was published a book called ONLY YESTERDAY. In this book events of recent years are described in chronological order, and it is surprising that incidents which really occurred "only yesterday," have apparently been relegated in our minds to dim distance.

Let us think back for a moment to our industry of "only yesterday,"—say ten years ago,—and consider the factors current at that time.

There was one price for crude oil in any given field, one price for gasoline to the public, and one margin to the dealer.

Integrated companies operated as a function of proper departmental costs, with profits in the various departments related to investment. Many companies operated in only one department of the business.

Spread before the industry was a beautiful panorama; an ample supply of raw material, efficient methods of manufacture for yield and quality, a steady and large annual increase in the number of consuming units, and in the demand per unit,—a pasture for nourishment, greener and more fertile than that of any current business—but:

Because of the profit in producing crude oil and the unusually high reward attending discovery, new capital was attracted to that department of the business. Because of past profit in refining, new capital was attracted to that department of the business. There began the development of the era where we had more crude oil than could be profitably refined and more gasoline than could be profitably sold.

Those who had more crude oil than could be profitably sold decided a simple remedy was to refine the crude. Those who had crude production and refineries with more gasoline than could be profitably sold, decided a simple remedy was the development of a retail business. Others who had previously operated only in crude production and had entered refining, finding no profit in this combination, decided their solution was to enter the retail business. The substantial gallonages and margins through retail outlets attracted new capital and many entered only this branch of the business.

Everybody became outlet conscious.

The development of outlets was divided in two major brackets; the building and leasing of service stations at considerable capital outlay, and the control of dealers, in the beginning by equipment arrangements, and later by wide and divergent margins.

Due to the peculiar nature of our industry, competition in the marketing branch had different objectives. There were several groups whose policies were at great variance;—the carefully trained executives of large companies, individuals without previous marketing experience who had acquired capital or position through fortuitous circumstance, and small mobile units whose methods were largely opportunist. There was a wide divergence in marketing policies and

marketing plans and a large dependence on high pressure selling methods.

Retail outlets increased enormously as all sorts of people were induced to enter the retail field and owners of businesses of every variety located on the highways were persuaded to accept equipment in order to build gallonage.

There was the illogical spectacle of a retail activity first competing by establishing outlets, and having secured an excessive number of outlets, competing on price.

Wide margins developed a condition where the industry distributed subsidies, and the recipients of the subsidies designed their marketing methods accordingly.

The steadily rising gasoline taxes gave opportunity for substantial profit where evaded and contributed to marketing methods which were destructive.

As a result of these factors, the number of outlets increased out of all proportion to the need.

It is therefore noted, that for the period 1920 through 1931, while motor vehicle registration increased 180 percent, and the consumption of gasoline increased 274 percent, the number of outlets increased in much larger proportion; 430 percent.

Although the total number of outlets has been practically constant during recent years, strictly drive-in service stations have shown steady annual increases, aggregating 940 percent over the period 1920 through 1931.

Glen B. Winship, in an article in the February 1932 issue of WORLD PETROLEUM points out that there is no economic justification for more than one filling station per 400 automobiles in a given area. If anything below such registration means danger to operating costs and consequently to profits, the accompanying chart is illuminating.

This chart shows the motor vehicle registration per service station and per outlet by states. It is noted that in only one area, i.e., the District of Columbia, is the registration above the theoretical danger line, while the majority of the states show a registration of less than half of the danger minimum.

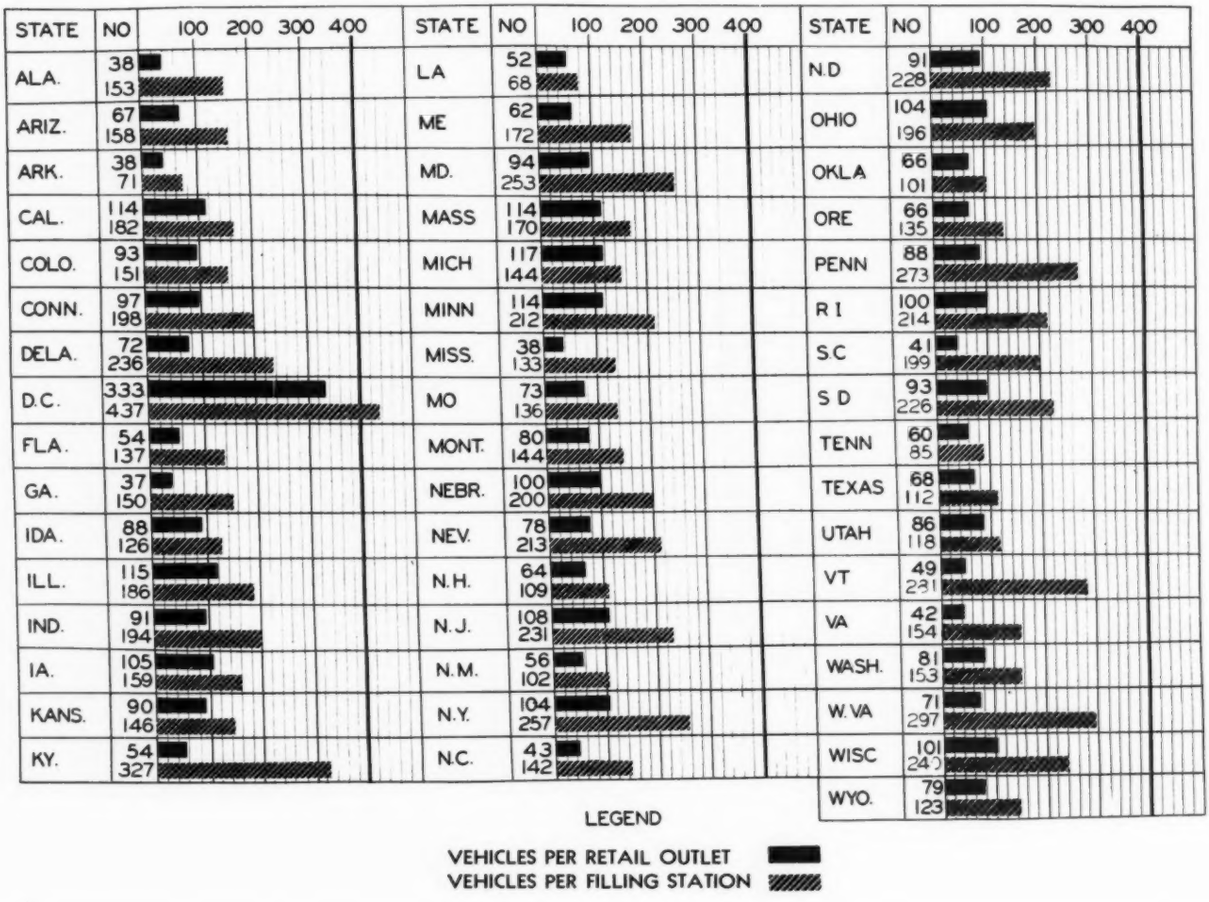
Beginning sometime ago, there were visible on the industry's horizon the clouds of a real and a potential overproduction of raw material and finished product. There had developed the competitive activity of those who considered their enterprises immune to economic trends; there had become operative a wide divergence of marketing methods, and there had been the creation of marketing subsidies.

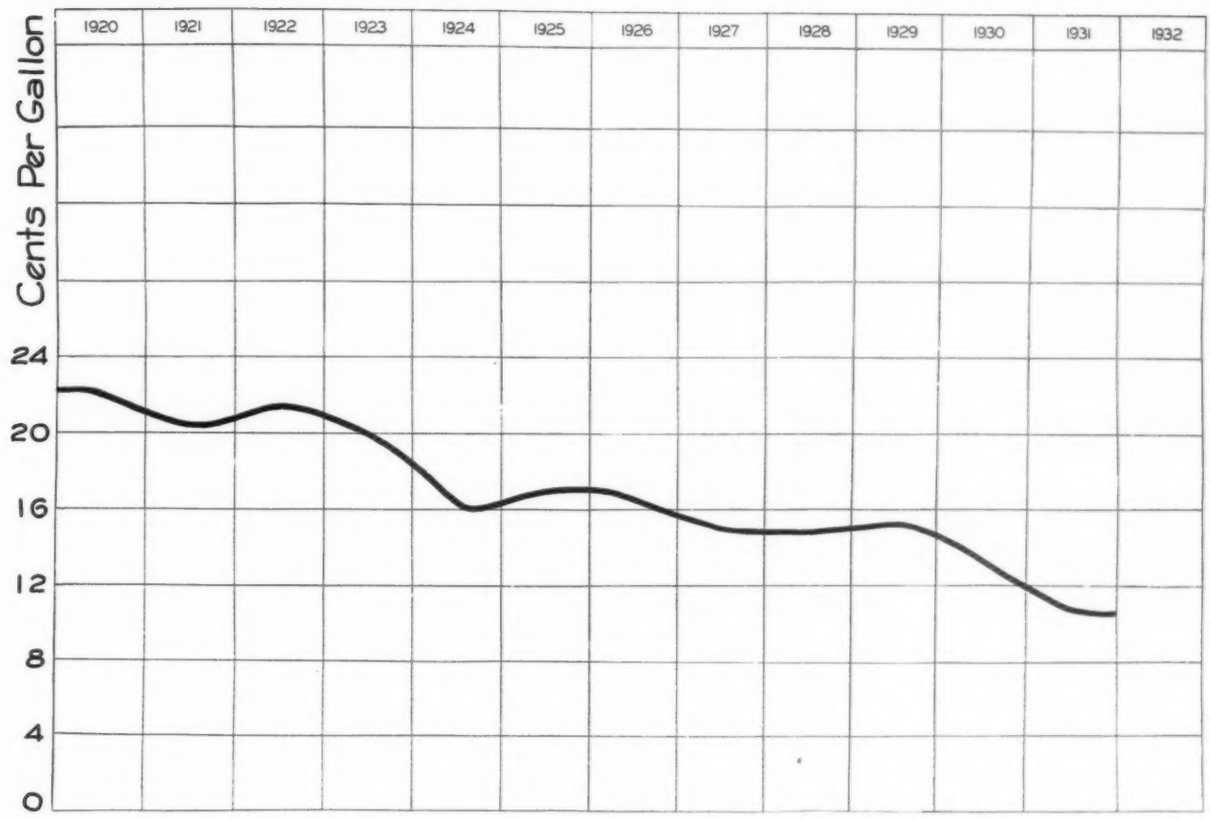
Because of these conditions, the pressure on the marketing branch, originating with the producers, passing through the refineries, was pressed to conclusion in the determination that what was produced and manufactured, must be sold.

Under this marketing pressure, how often have we seen geographical advantage accomplished through transportation media, crude or refinery location, entirely sacrificed to secure in the marketing area where the advantage was enjoyed, a retail sales volume which brought about either a reduction in gross profit for all, or the establishment of equivalent facilities by competitors.

Under this pressure, how often have we

Four hundred vehicles per filling station represent minimum danger line; only the District of Columbia is above the danger line.





Difference between average net retail gasoline price in fifty cities and posted crude oil price showing steadily decreasing margin for refining, transportation and distribution.

seen sales plans promulgated on a price or concession basis, designed to give particular advantage to the originator, always culminating in the only possible result,—that the new plan was met by all competitors or perhaps a further "improvement" devised and nothing accomplished but a temporary shifting of gallonage and a reduction in gross profit.

As an effect of the endeavor to increase gallonage or to protect a previous gallonage position against the attacks and development of others, there resulted an effort to sell more than market requirements. Since this could not be done and since the factor of price to the consumer has little material bearing on total consumption, only one conclusion could obtain,—the persistent hammering, perverting, and distortion of the price structure, so that competition was both on price and on price structure, resulting in a steadily increasing number of outlets with a lower gallonage per outlet, a higher cost per outlet, and a continuously lowering retail price.

The green and fertile pasture of "only yesterday" was no more. The industry had so gorged itself and dulled its palate with marketing panaceas,—so choked itself in an attempt to digest an impossible number of outlets,—that the pasture looked to be dull brown feeding and the once fertile soil showed a sickening tinge of red.

The steadily decreasing gap between the posted price of Mid-Continent crude at the well and the average net service station price reflects in some degree the increased yield of gasoline from crude oil, which had been accomplished at great capital outlay, shows clearly the effect of past marketing practices on retail prices, and leads one to wonder if the industry has not exterminated profit by individual departments, and, ignoring the capital invested in these departments, has come to the point of an attempted profit consideration which is a direct function of the net price obtained for crude oil.

Sane Marketing

WE ALL KNOW only too well how difficult it is to give up outlets; yet we all know there are too many outlets.

The reason for these excessive outlets and for their continued existence, is that they are the *effect* and not the *cause*, and we cannot appreciably reduce the effect until the cause has been eliminated.

The *cause* producing the outlet *effect*, is a marketing structure which has created immoderate outlets by wide margins, has then attempted to offset consequent reductions in gallonage by wider margins, thus creating additional outlets, further diluting the marketing, finally establishing the vicious circle with which we are all familiar.

A further complication in recent years naturally resulting from this marketing structure, has been the development of the so-called cut-price stations, whose activity and growth have not yet been successfully combated.

We have had too much crude oil,—too much gasoline.

We have pressed on the market more material than it could absorb.

The majority have attempted to increase sales by added outlets and price concessions, not tempering this activity with the knowledge that such mechanics do not materially increase consumption. This appalling competition has begotten a marketing structure which is devouring us.

Throughout all this, there were those who did not ignore sound economics in their thinking and in their planning.

They attempted to set a true course; but the terrific tide of competition has swept over their individual efforts,—thrown them into a tempestuously competitive sea, struggling for gallonage-breath in order to keep alive the nucleus of their business.

Throughout all this, the industry has attempted to come into accord compliant with its legal adhesions, and has labored to eliminate the cancerous growths which have attended economic mal-adjustment.

The establishment of the Code has proven a constructive move, quite generally removing price from the rumor column.

The application of crude proration and the intelligent control of refinery runs have been constructive accomplishments of the industry, and all have gone far to rectify the conditions which originally brought about the infirmities of the marketing branch of the business.

And, in marketing there are evident signs of improvement.

There is an involuntary moratorium on the creation of outlets, due to surfeit.

The loaning of equipment has been gradually reduced and we are within sight of the time when it can be entirely discontinued.

There has been successful pressure applied to tax evasion.

Aggressive planning and thinking is being directed to the problem of the so-called cut-price stations.

Chief executives have made themselves familiar with the details of marketing and are interesting themselves in the application of good practice.

All these factors, and many others equally constructive, are working to eradicate those things contributing to our marketing ills.

They have brought some improvement and will continue in that direction; but none has struck directly at the cause of our ailments, which is simply this,—the attempted maintenance of a retail price structure which does not bear a constant relationship to wholesale competitive prices.

Is it not possible to augment the present necessary and improving trends by adopting a policy which will automatically contribute a positive influence toward an economically sound marketing structure?

In his careful analysis of our marketing situation which Mr. Holliday presented to the Institute Meeting at Tulsa in June, 1932 he stated:

> There was an interesting article in the Harvard Business Review three or four years ago on the subject of prices, which points out that in some industries it is economically natural that there should be a follow-the-leader tendency as to prices—the normal leader being the largest marketer in the competitive territory. The principal characteristic of such industries is that the demand for their product is primarily a derived, or secondary, demand created by other industries. The steel industry is given by the author as one example, an industry the demand for whose products is created by the manufacturing and building industries; and the gasoline industry is given as another, an industry the demand for whose product is created by the automobile industry. In such industries, the author points out, competitors tend to follow the leader, i.e., their prices go up and down with the leader's, even though they do not exactly match them.

Can we not, then, look to constructive marketing leadership in the industry? Leadership which will establish in competitive territories throughout the entire country retail price structures on sane economic bases related to wholesale competitive prices, maintaining these structures as a constant function of such prices.

▼

Present Status of Roumanian Oil Industry

Extremely Heavy Taxes and Lack of Capital Constitute Greatest Obstacle to Putting Roumanian Oil Industry on a Permanently Paying Basis.

By M. David Gould

THE SPECIAL consideration given by the world oil stabilization conferees to Roumania, reflected in the final terms of the agreement of the Roumanian producers with the Conference, indicates an appreciation of the position of Roumanian production in the world market. It competes in European markets with Russian products, against their advantages of low capital costs, large flush production, and aggressive selling methods, on the one hand; and on the other, with the big English and American companies, certain of which have in addition substantial interests in Roumania.

It has carved out for itself about one-eighth of the European market, but at the cost of continually lower prices in the last three years. The comparison of export volume with value clearly indicates that this sort of progress has its limitations.

Roumanian Oil Exports

	Metric Tons	Value in Millions of Lei
1929	2,822,900	9,532.3
1930	3,867,206	10,408.6
1931	4,667,982	6,901.0

At the same time the entire national economic policy swung around in a new direction after 1929 with the victory of the National Peasant party over the Liberals, who had been in control for years. The policy of the latter, looking toward industrialization on the basis of the country's own resources resulted in the petroleum legislation of 1924 which tended to concentrate ownership of Roumanian oil resources in native hands. In 1929, the oil laws were liberalized to the advantage of outside capital and at the same time the first major post-war Roumanian foreign loan was floated, followed by another in 1931. As a result, one of the major considerations of national policy became the stimulation of export trade with a view to obtaining a sufficient surplus of exports with which to meet payment on the foreign loans.

Petroleum products constitute the largest single item in the Roumanian export trade, amounting to over a third of the total value. The government has levied heavy taxes on the industry, and this has led to aggressive efforts to find outlets. Increased crude production through improved drilling methods, deeper drilling in the older fields and the bringing in of two important new areas, the Boldesti and the Gura-Ocnitei has added to the pressure for the development of export

trade. The domestic market is limited by the relatively low standard of living of the population, which absorbs at the most a fifth of the present production, compared with two-fifths as recently as 1926.

Given these conditions, and the competitive situation described above, together with such factors as excessive but generally speaking old-fashioned refining capacity, limited storage facilities and insufficient capital, the result could only be a policy of sales at any price, with consequent market demoralization.

These were among the broad reasons for the attitude of the oil conference in making concessions to Roumanian producers in the form of better prices, limited punitive options on underprice oil sales, confirmation of existing markets and no essential sacrifice of production.

The Boldesti field is unique in being the first and only field operated under the unit plan, which is particularly difficult to operate in Roumania because of the split-up ownership of land and the overriding rights of the state as sole owner of oil in the ground. Astra Romana (Royal Dutch-Shell) and Romano-Americana (S.O.N.J.) together with Steaua Romana (one-third each Roumanian, French and English ownership), have been the dominating interests in this field. Since these companies cooperate in the distribution field to the extent of selling through a joint sales agency, it was not difficult for them to get together on the production end where operating conditions were so favorable.

The wells run 6,000 to 7,000 bbl. a day initial production, but since neither pumping nor gas lift methods are being installed, are mostly pinched down to 400 bbl. to maintain pressure. Drilling is down to the lowest proven producing formation at about 7,800 ft., in the structure locally known as the "meotic." The oil is paraffinic, like two-thirds of Roumanian oil, with a specific gravity of .835–.845. It runs about 15 percent gasoline, with 10 percent paraffin and 50 percent residues. In the first eleven months of 1932 production from Boldesti was 7,104,937 bbl.

The Gura-Ocnitei field is divided up among a score or more of producers, of whom four, the Steaua Romana, Concordia (a French group), Unirea (English) and Romano-Americana, produce about two-thirds of the total output. This amounted in the first eleven months of 1932 to 13,391,301 bbl. or over 39 percent of the total production of the country.

The oil, produced at a depth of about 4,300 ft. from the Dacian strata, is moderately heavy and asphaltic, with a specific gravity of .840–.910, and containing anywhere from 45 to 75 percent of residues. Average initial production of wells in this field has been about 4,000 bbl.

Oil men in Roumania are keenly alive to technical progress, but are hampered in practical applications by chronic capital shortage. Rotary drilling is being more and more widely used, particularly as drilling operations have deepened, from 4,000–4,500 to 7,500–8,000 ft., depths unheard of until a few years ago. The savings in time and cost, and particularly the possibility of drilling straighter holes at greater depths, are being widely discussed. The use of single tubing, and of bigger drill collars are also features of economy and technical advance in Roumanian practice.

In the refining field, about 80 percent of the gasoline obtained is still straight-run, although cracking is gaining ground steadily. One of the larger English companies was burning its stocks of fuel oil residues a year ago as the only way to get rid of them; this year it has installed cracking coils. The Steaua refinery at Campina is the newest in the country, and incorporates a number of advanced features of design. For the whole industry, however, the average percentage of gasoline recovery to throughput is about 21 percent, indicating enormous room for improvement, when questions of capitalization, price and marketing have been settled. It is noteworthy that the desirability of a high octane number is one of the reasons for the increasing advocacy of cracking in the Roumanian refining industry.

Kerosene, which is the backbone of a large part of the export trade and of the domestic trade as well, is still refined by the sulphuric acid treatment method.

In lubricating oils, Roumania is a larger buyer than seller, although in connection with the depression its purchases have declined from 30,205 bbl. in 1929 to 19,544 bbl. last year, with the United States supplying about three-fifths of the total. The relatively small Roumanian production of lubricating oils is chiefly made from asphaltic base crudes; lack of capital in the large amounts needed is a determining factor in limiting the production of these highly-finished products.

The increasing importance of exports in the Roumanian oil trade is illustrated by the accompanying comparison of exports and internal consumption since 1926.

The major markets are England, France, Italy, Spain (Steaua Romana has an important contract with the Spanish oil monopoly), Austria and Czechoslovakia. The Egyptian market is impor-

Bustenari field, one of Roumania's important producers.

tant because of its heavy consumption of kerosene, Egypt taking over a fourth of Roumania's production.

Roumanian Exports and Domestic Consumption
(Barrels of 42 U. S. Gallons)

	Exports	Internal Consumption
1926	10,442,957	7,300,314
1927	13,393,331	7,729,337
1928	16,408,098	8,028,132
1929	19,742,506	8,522,687
1930	26,503,120	8,682,247
1931	31,939,551	8,149,316
1932	25,514,433	5,869,556

Roumania holds a dominating position in a number of the smaller nearby markets,notably Hungary, and Yugoslavia besides the greater part of the business in Palestine and a considerable proportion throughout the Mediterranean area. The larger industrial countries, while constituting the major market in volume, derive a relatively small part of their total requirements from Roumanian sources. Russian competition, favored by the foreign trade monopoly of the Soviets, is felt particularly in these countries.

Mention has been made of the effect of the chronic shortage of capital in holding back technical progress in refining, and in tending to stimulate sales at unfavorable prices by weak financial interests faced by need of cash and limited storage facilities.

The reasons for this condition can be traced back to the restrictive attitude of the government toward foreign capital investment in Roumania, a policy which was not radically reversed until the year in which the world-wide crisis broke out. At the present time, the government, having secured its control of the industry by other means to be described later, seems content with the existing division of the industry, which, in terms of nationality of the invested capital, was, according to a recent tabulation, as indicated in the accompanying table.

The undercapitalization of the industry, however, could not be made up during a time when prices and profits were shrinking rapidly; crude which commanded 17,000 lei (over $100) per carload of 10 tons, is now quoted around 3,500–4,000 lei.

Old material is being re-used, undermaintenance is accumulating, and above all the high level of taxation is driving some of the weaker companies to the wall. In a number of cases where liquidation of the enterprise would seem to be in order, however, the banks which are in control have refused to take the loss, which would weaken their own balance-sheet position, and in this way an unsound condition is continued.

Total invested capital is estimated at some 11,000,000,000 lei, or about $70,000,000. The value of the output of the industry is placed at 15,000,000,000 lei but the taxes take up fully 40 percent of the value, or some 6,000,000,000 lei. In view of the fact that the total budgeted expenditures, which were 35,000,000,000 lei in 1929, have been reduced to 15,000,000,000 for the coming year, it is clear that the oil industry is depended upon to supply a major part of the income. It is interesting to note that of the budgeted expenses, about 6,500,000,000 lei represent service of the funded debt, half of it foreign; in other words, the income from oil is looked to for the payment of interest and amortization on the government debt.

In view of the serious financial difficulties under which the government is laboring at the present time, it seems more than doubtful that any relief from heavy

Nationality of Capital Invested in Roumanian Oil Industry

	Percent
Roumanian	26.2
English	20.6
English-Dutch	16.2
French and Belgian	22.0
American	10.1
Italian	3.4
Others	1.5
Total	100.0

taxation can be expected in the near future. Even the indirect form of relief, through a reduction in the burdensome freight charges on the government-owned railroads, which was vigorously discussed some time ago, has been thrust into the background. A recent paper by a Roumanian petroleum engineer pointed out 21 different kinds of taxes and charges borne by the industry.

Motor gasoline is quoted at 1,885 lei per ton (nearly 4 cents a gallon) at the refinery, exclusive of taxes. These amount to 8,115 lei per ton, or over four times the net-back to the refiner, bringing the cost at the refinery including taxes (and a charge of 100 lei for tankage and loading) to 9,900 lei per ton. Naturally these prices apply to the domestic market, resulting in a price at the refinery of about 20 cents a gallon.

In the export market, prices at the main Black Sea port, Constantza, have been fairly consistently above United States quotations f.o.b. Gulf on most products before the new system of fixed differentials at Constantza based on f.o.b. Gulf. Here a reduction of railroad rates granted

(Continued on page 61)

The highly developed Campina field, another leading Roumanian producing section.

Cosmic Genesis of Petroleum

A Distinguished Authority on Sources of Petroleum Logically Discredits Theories That Suggest Organic, Chemical and Volcanic Origins.

By Walter H. Jeffery

THE SUBJECT of the genesis of petroleum and natural gas has been a controversial one among scientists from the time these hydrocarbons first were produced from wells. Several hypotheses have been advanced, each having eminent exponents. The most generally accepted of these has been the organic theory; next in importance is the inorganic chemical theory. Twenty-five years ago Eugene Coste, in several able papers, presented his volcanic theory, but he did not gain many adherents. A. Beeby Thompson, in his book OIL FINDING, made passing reference to a cosmic theory which had been advanced by a German scientist.

The writer has for many years given much thought and study to this interesting subject, and it is his conviction that a more tenable hypothesis must be sought for the origin of the hydrocarbons.

We shall first attempt to point out where three of the theories mentioned, the organic, the inorganic and the volcanic, fall short of a logical explanation for the genesis of the vast quantities of petroleum that have been and now are being produced from the earth.

WHILE it has been generally assumed that petroleum resources are irreplaceable the author of the accompanying article adduces reasons to show that this may not be the case and that petroleum even now may be in process of manufacture by the slow, complicated processes of nature. Mr. Jeffery attempts in the accompanying article to discredit the recognized theories that have been advanced to explain the origin of oil and from his large fund of experience and study of problems connected with drilling and geology to furnish a theory, verified by accepted beliefs relating to the genesis of the cosmos, to explain not only the presence of vast quantities of oil but to suggest the continuing formation of other reserves as yet untouched. Strongly supported by numerous authorities, Mr. Jeffery's hypothesis is of great interest to the layman as well as to the scientist.

Organic Theory

THE ORGANIC, perhaps the most widely accepted theory, holds that the hydrocarbons are the result of destructive distillation of vegetal and (or) animal remains imprisoned in the strata. In support of this theory the bituminous coals, admittedly formed from vegetal matter, the product known as icthyol, found in fish beds in Poland, the methane, or marsh gas, derived from decayed vegetation, and other similar evidence are advanced.

Let us first examine the premise that petroleum is the result of the distillation of organic remains. It is true that fossilized bones of animals and shells of crustacea are found in the stratified rocks of all ages. But of the tissue that was associated with those remains there is not the slightest trace. The process of decomposition of such organic remains is visible today. We find the bleached bones of the animal and the empty shell of the clam, but the organic matter that was associated with them had been consumed by birds or animals or it had escaped into the atmosphere long before it could have been covered by sediment or otherwise imprisoned in the strata in process of formation at the surface. Granted that during periods of volcanic activity, folding of the surface formations or other earth convulsions some organic remains may have been entombed, yet, due to the comparatively small quantity of such remains, they could hardly have accounted for the one-tenth part of the oil content of the Woodbine sand of east Texas alone.

That vast quantities of vegetal matter were imprisoned in the strata of the Carboniferous period is admitted. But if, as is postulated, the gas and the oil were distilled from such vegetation, the process should have left in the rocks a residue of coke. (Eugene Coste, Volcanic Origin of Natural Gas and Petroleum: Journal of Canadian Mining Institute, Vol. VI.) However, this writer, during a long period of geological reading, has yet to see the first allusion to the observance of any coke or other residuum that could have remained from such natural distillation. That gas and oil which might have been generated in the Carboniferous period may have migrated into the rocks of later age, as the Cretaceous, is admitted, but how are we to account for the hydrocarbons in the pre-Carboniferous rocks, such for example as those of the Ordovician period, or for the hydrocarbons that have been reported as observed in volcanic emanations or in meteorites? Quoting from Geikie:

"If what takes place at the present day may fairly be taken as an indication of what has been the ordinary condition of things in the geological past, there must have been so many chances against the conservation of either animal or plant remains that their occurrence among stratified formations should be regarded as exceptional and as the result of various fortunate accidents.

"On land.—Let us consider, in the first place, what chances exist for the preservation of remains of the present fauna and flora of a country. The surface of the land may be densely clothed with forest, and abundantly peopled with animal life. But the trees die and moulder into soil. The animals, too, disappear, generation after generation, and leave few perceptible traces of their existence. If we were not aware from authentic records that central and north-

ern Europe was covered with vast forests at the beginning of our era, how could we know this fact? What has become of the herds of wild oxen, the bears, wolves and other denizens of the lowlands of primitive Europe? For unknown ages, too, the North American prairies have been roamed over by countless herds of buffaloes, yet, except here and there a skull and bones of some comparatively recent individual, every trace of these animals has disappeared from the surface. How could we prove from the examination of the soil either in Europe or North America that such creatures, though now locally extinct, had once abounded there? We might search in vain for any superficial relics of them, and should learn by so doing that the law of nature is everywhere 'dust to dust.'

"The conditions for the preservation of evidence of terrestrial (including freshwater) plant and animal life must, therefore, be always local, and, as to say, exceptional. They are supplied only where organic remains can be protected from air and superficial decay.

"In the next place, if we turn to the sea, we find certainly more favorable conditions for the preservation of organic forms, but also many circumstances which operate against it.

"Of the whole sea floor, the areas best adapted for preserving organic exuvial are obviously (1) that juxta-terrestrial belt in which life is most varied and abundant, and where sediment, transported by rivers and currents from the adjacent shores, is chiefly laid down: and (2) those tracts of the open ocean where the bottom rises near enough the surface to become the home of an abundant flora and fauna and the site of thick deposits of organic remains, as on the tops of submarine volcanic ridges. The most favorable conditions for the accumulation of a thick mass of marine fossiliferous strata will arise when the area of deposit is undergoing a gradual subsidence. If the rate of depression and that of deposit be equal, or nearly so, the movement may conceivably continue for a vast period without producing any great apparent change in marine geography, and even without seriously affecting the distribution of life over the sea floor within the area of subsidence. Hundreds of thousands of feet of sedimentary strata may conceivably be in this way heaped up around the continents, containing a fragmentary series of remains, chiefly forms of shallow-water life which had hard parts capable of preservation." (Sir Archibald Geikie, R.F.S., TEXT BOOK OF GEOLOGY.)

The American Petroleum Institute has for several years conducted fundamental research in petroleum. Project 4 under the title ORIGIN AND ENVIRONMENT OF SOURCE SEDIMENTS, advisory committee: Alexander W. McCoy, Chairman, Austin H. Clark, W. A. J. M. van Waterschoot van der Gracht, T. Wayland Vaughan and S. S. Waksman, in a report or progress has this to say:

"2. Cellulose and its decomposition products are present in very small amounts in marine sediments. This tends to invalidate those theories of the origin of petroleum which maintain that oil is derived from the débris of higher plants."

"6. The deep-sea sediments over the entire world are deficient in organic matter, and cannot be considered as favorable source material."

Quoting from the same report, Project 5, title DIATOMS AS A SOURCE OF OIL, under the direction of Professor L. B. Becking and Professor C. L. Tolman, Stanford University:

"Thus the Neuberg theory of petroleum formation by anacrobic decarboxylation of fatty acids has been conclusively disproved.

"The negative results obtained thus far by no means disprove the biogenesis of petroleum, they only limit the possibilities."

We must admire the tenacity with which some scientists continue to cling to a hypothesis that even their own extended research has demonstrated is untenable.

Dr. Parker D. Trask of Stanford University has made extended research on the organic content of the present day sediments, and the results of his work seem to indicate a decided lack of rich organic material in these sediments as well as the almost complete absence of free oil.

The evidence accumulates that a growing number of scientists is beginning to entertain grave doubts about the organic genesis of petroleum.

Inorganic Origin

This hypothesis is that petroleum and natural gas are the result of chemical reactions within the earth. It postulates that large quantities of calcium, iron and other carbides are contained within the earth, and that percolating waters, gaining access to these deposits, would generate hydrocarbon gases which, under heat and high pressure, are condensed into petroleum as we find it. Various hydrocarbons containing part, at least, of the constituents of petroleum have been produced by chemists in their laboratories.

Quoting from Geikie:

"Attention may be directed here to M. Moissan's important researches into the combinations of metals with carbon, which have brought to light some suggestive facts in regard to this subject. He has succeeded in forming artificially a large series of metallic carbides, one class of which is readily decomposed by cold water, yielding various gaseous or liquid hydrocarbons. Thus aluminum dissolves carbon, and in contact with water yields alumina and pure marsh gas or fire damp. The association of mineral oil, marsh gas, and other hydrocarbons and of carbonic acid in old volcanic districts may thus point to the continuous decomposition of such carbides by access of water. M. Moissan suggests that some explosive volcanic phenomena may even be due to the same cause. The latest emanations from waning vents might range from asphalt and mineral oil up to the most complete oxidation in carbonic acid." (Procedures of the Royal Society, 1897.)

The inorganic theory is perhaps the more logical of these two theories in accounting for the vast quantities of oil that have been produced from the earth and that are known to be contained in its many productive strata. This theory, however, is open to doubt. The behavior of water in its action on other elements in laboratory experiments should scarcely be taken as evidence of what happens when the same water encounters the same elements at great depth. Due to excessive temperature and pressure, water becomes a powerful acid at great depths. Quoting from Geikie:

"At a temperature of 18 deg. water is about 100 times weaker than silicic acid . . . at about 300 deg. it is estimated that water and silicic acid are about equally strong, but that at 1,000 deg. water is some 80 times, and at 2,000 deg. about 300 times stronger than the acid."

It would seem, therefore, that the production of hydrocarbons in laboratory experiments, as evidence of the inorganic genesis of petroleum, should be accepted only with much reserve.

Here let us review the vast quantities of petroleum that have been recovered and the known reserves that remain in the strata yet to be produced in the United States. From 1859 to 1931 inclusive there has been a total of 13,996,847,000 bbl. of oil produced in the United States. The U. S. Bureau of Mines estimates that the recovery from oil sands varies between 10 percent and 20 percent, and that from 80 percent to 90 percent of the oil remains in the productive formations, unrecoverable by present methods. (The Bradford water drive, gas repressuring, and the use of acid might tend to increase these recovery factors somewhat.) But, taking the maximum factor of 20 percent as a basis, we have a total of oil produced and left in the sands of 69,984,235,000 bbl., much of which is yet to be produced from present productive fields.

The present estimated potential re-

coverable production of the Yates ranch in Pecos county, Texas, the Oklahoma City field, the Kettleman Hills field and the vast East Texas fields aggregate around 5,000,000,000 bbl. It is reasonable to assume that new fields yet to be discovered, with those now in production will, over a period of 25 years, yield as much oil as already has been produced. On this basis 25 years hence we shall have produced and shall still have left in the ground, recoverable and unrecoverable, a total of 139,968,470,000 bbl. of oil.

To store this vast quantity of oil, assuming the hypothetical situation where all of it could be assembled above ground at one time, would require 139,968,470 of the 1,000 bbl. lease tanks such as may be seen in the fields today. This battery of tanks would form a continuous belt extending more than 22 times around the earth at the equator, or they would fill a space of 2,267 square miles, an area 100 miles long and 22.67 miles wide.

We have been dealing with the known oil fields and reserves in the United States. An interesting side light on the possible oil reserves in the Canadian Northwest is contained in a recent paper delivered by Max W. Ball before the annual meeting of Petroleum Geologists in March 1932. He said that, "The Athabaska oil sand areas of Alberta cover an area of 10,000 square miles, of an average thickness of 50 feet saturated 15 percent and, contain a total of 250,000,000,000 bbl. of oil."

Confronted with these Gargantuan quantities of oil the organic theory of the origin of oil fails utterly; the inorganic chemical theory also is inadequate, we must look elsewhere.

Coste long ago rejected the organic theory when he advanced his volcanic hypothesis. He was partially right, but it is possible that he "put the cart before the horse" and, instead of vulcanism being the cause of the origin of the hydrocarbons, it may be an effect. As Coste pointed out, the craters caused by the violent blow-outs of high pressure gas and oil wells out of control are somewhat similar to volcanic manifestations. (Eugene Coste, Volcanic Origin of Natural Gas and Petroleum: Journal of Canadian Mining Institute, Vol. VI.)

It is this writer's conviction, after long study of this interesting problem, that natural gas is primordial, that it is a natural product of the hot gases of which our earth consisted at its birth, and that petroleum is the result of compression at high pressures of the gas, much as gasoline is produced from natural gas by compression today.

The problem of the origin of the earth has engaged the active interest of astronomers and men in other branches of science for ages. About 150 years ago Laplace, the great French mathematician, advanced his nebular hypothesis. Contemporary with Laplace, Immanuel Kant, great German physicist, and William Herschel, English astronomer, each reached conclusions similar to those of Laplace.

Kant reached his conclusions from his researches in natural philosophy; Laplace, by mathematics; Herschel, by extended telescopic observations of the heavens. Herschel made the discovery of the gradual transformation of nebula into stars.

During the last quarter century American and English scientists have come to discredit the nebular hypothesis, pointing out that in the light of modern astronomical knowledge it is no longer tenable. Two new theories have been advanced, the planetesimal theory of Professors Chamberlin and Moulton of the University of Chicago, and the tidal theory of Sir James Jeans.

The planetesimal theory postulates that a star passed so close to another star or a sun that great tides were raised upon one of them out of which a spiral nebula of discrete masses and particles was projected. The two arms of the nebula then evolved into our solar system with a sun of hot luminous gases and the other planets, including the earth.

Jeans' tidal theory (THE UNIVERSE AROUND US).

"When two stars or other bodies pass close to one another without collision, the primary effect must be that each raises tides in the other. The closer the approach, the higher the tides in general, although something must depend also on the speed with which the bodies pass one another, because this determines the length of time during which they influence one another.

The birth of planets. The long arm or filament of matter drawn out of a star by tidal action is first continuous in its structure, but analysis shows that it provides a fit subject for the operation of what we have called 'Gravitational Instability.' Condensations begin to form in this long arm of gas in the way already described. As before, the smaller condensations are dissipated, while the larger increase in intensity until finally the filament breaks up into a number of detached masses—planets have been born out of the smaller star. . . ."

A diagram illustrates the several planets comprising the solar system. A line drawn around these planets makes an outline shaped like a cigar and extending outward from the sun, indicating that a long arm of gas had been raised out from the sun, the gas later breaking up and condensing into what later became Mercury, Venus, Mars, Earth, Jupiter, etc.

Quoting again from Jeans:

We believe, nevertheless, that some two thousand million years ago this rare event took place, and that a second star, wandering blindly through space, happened to come within hailing distance of the sun. Just as the sun and moon raise tides on the earth, so this second star must have raised tides on the surface of the sun. But they would be very different from the puny tides which the small mass of the moon raises on our oceans; a huge tidal wave must have traveled over the surface of the sun, ultimately forming a mountain of prodigious height, which would raise ever higher and higher as the course of the disturbance came nearer and nearer. And, before the second star began to recede, its tidal pull had become so powerful that this mountain was torn to pieces and threw off small fragments of itself, much as the crest of a wave throws off spray. These small fragments have been circulating around their parent sun ever since. They are the planets, great and small, of which our earth is one. (THE MYSTERIOUS UNIVERSE, Sir James Jeans.)

Quoting from Oswald Thomas, former chief, Urania Observatory, Vienna; HEAVEN AND EARTH:

That our Sun is a ball of gas no one doubts today. That our Earth was created out of the substance of the Sun, that it is a child of the Sun, or at least that it and the Sun were born of the same primal nebula, is also generally accepted.

We may accept any of these hypotheses for the origin of the earth, or we may reject them. The important thing to this discussion is that each of these theories, with the possible exception of Chamberlin's planetesimal theory, presupposes the genesis of the earth in a nebula which must have been for the most part gaseous, for the reason that the sun, out of which it apparently also was born, is known to be gaseous.

One cannot make a study of astronomy without becoming impressed with the evidence that the universe consists principally of vast space very sparsely occupied by gaseous bodies. The billions of luminous stars, of enormous nebulae, of comets and other heavenly bodies are, for the most part quite evidently gaseous.

We now come to a discussion of our earth and its interior. The theory, long held, that the interior of the earth is molten has during late years been discarded by many scientists who hold that it is dense and rigid like the hardest steel. This opinion is based on the action of seismographic waves through the earth. It is known that these waves travel with greater speed through hard rock formations than through soft, and their speed through the earth in recording earthquake socks indicates that they pass through hard and dense substances.

Let us, with such information as we have, examine into the probable conditions within the earth. The penetration of the earth's crust by the drilling of deep wells indicates a fairly uniform acceleration of temperature as depth increases. The several wells that have reached

depths of around 10,000 ft. had bottom hole temperatures of from 160 deg. to 200 deg. F. Temperatures below 10,000 ft. may only be approximated by theoretical calculation, and scientists are so at variance in their estimates of temperature at great depths as to approach absurdity.

Lord Kelvin has computed that if the rate of increase of temperature is taken to be one deg. F. for every 51 ft. for the first 100,000 ft., it will begin to diminish below that limit, being only one deg. F. in 2,550 ft. at 800,000 ft. depth and then rapidly lessening. Based upon these calculations it would appear that the temperature at the center of the earth would be approximately 4,200 deg. F.

Jean Henri Fabre in THIS EARTH OF OURS goes to the other extreme. He says:

> At three kilometers below the surface there must be 100 deg. C. of heat, or the temperature of boiling water; at twenty-one kilometers, 700 deg., or the temperature of red-hot iron, . . . and, finally, at the depth of forty-eight kilometers, there is a heat of 1,600 deg., the melting point of platinum, one of the hardest of metals to melt. If the rule I have stated continues in force to the center of the earth, sixteen hundred leagues from the surface, there should be at that point a heat of 210,000 deg. C., or more than a hundred times the greatest heat we can produce. Nothing can give us any idea of this terrific heat, a heat more than enough to melt and even vaporize all known substances, including metals. . . . Such being the case, we are to think of the earth as a globe of matter liquefied by heat, with a thin crust of solid material enclosing this central ocean of molten mineral substances. From this it is but a step to the thought of an earth that was originally all fluid. The firm crust of our time became what it is only by the cooling off of the earth's surface.

Dr. Bernard Hubbard reports that when he reached the summit of the great Shishaldin volcano in Alaska the blue haze issuing from the main vent indicated a temperature of over 2,000 deg. C., equivalent to 3,632 deg. F.

Quoting from William J. Luyten's THE PAGEANT OF THE STARS:

> The conclusion is reached that most of the inner part of the earth is more rigid than steel, although in the very center it may be liquid in consistency. To this knowledge of the earth's interior, Jeffreys has added some data concerning the temperature, having found that where the increase in temperature is about 1 deg. C. for every 100 ft. downward, layers deeper than 400 miles below the surface are still at practically the same temperature as when the earth was born.
>
> On the surface of the earth the greater part of matter is in the liquid or solid state. In the stars matter is not only gaseous, but the high stellar temperatures have broken it up in simpler constituents, atoms and electrons. Iron, on earth, is solid; in the universe at large it exists solely as vapor, and in this vapor in the form of mutilated atoms which have lost some of their electrons. Solid matter is an exceedingly rare occurrence, and it may well be that a large portion of all matter exists as protons and electrons.

It is difficult to reach a satisfactory conclusion regarding the temperature or condition of matter at the center of the earth. In all likelihood it is so hot there that all matter is liquid or gaseous. At the pressure existing there, ranging from the normal water pressure of .434 lbs. per foot of elevation, or 9,000,000 lbs. per square inch, to the accelerated pressure calculated by Laplace of about 40,000,000 lbs. per square inch, we would in any case have a pressure that would render even gas more rigid than the hardest steel at the surface. Taking as an example the compression of gasoline from natural gas, it is quite probable that the extreme pressures existing at the center of the earth have reduced all matter to a white hot fluid. If this is true, then this fluid would be compressed to the consistency of the hardest steel.

Quoting from Geikie's TEXT BOOK OF GEOLOGY:

> The interior of the earth, therefore, with the exception of a solid crust about 40 kilometers thick, consists of a molten magma 100 to 200 kilometers in depth which shades continuously inward into a gaseous center. The liquids and gases in the interior possess a viscosity and incompressibility such as permit them to be regarded as solid bodies.

Professor Arrhenius, Nobel Institute's Director of Physico-Chemistry, also holds the view that the center of the earth cannot be solid.

It seems clear that at a depth of 40 miles or less from the surface of the earth the temperature would be sufficiently high to fuse all known substances with the possible exception of tungsten. What would be the character of this magma or the gaseous emanations from it?

Of the known gaseous elements in the sun, hydrogen, carbon and helium are shown in the spectrum to be present in vast quantities. Most volcanoes discharge hydrogen and carbon, or these gases in combination with other elements, as sulphur, so it is apparent that these elements are contained within the earth; the elements composing the hydro-carbons.

Quoting again from Geikie:

> Carbon . . . . Combined with hydrogen it yields methane, marsh gas or fire damp (CH_4) which has likewise been found to be present in the microscopic cavities of igneous rocks . . . .

Quoting from J. Hart-Smith, RECENT DISCOVERIES IN INORGANIC CHEMISTRY:

> Hydrocarbons. The direct synthesis of methane has been shown to take place at temperatures above 1,000 deg. At temperatures above 1,900 deg. acetylene is also produced and some of this at high temperature decomposes with formation of methane. When small quantities of carbon are used it is possible to convert 95 percent of it into methane.

Just what is methane? H. P. Westcott in his HANDBOOK OF NATURAL GAS says it is composed of 74.97 percent carbon and 25.03 percent hydrogen. Tests of the natural gas produced in many of the fields of the United States have shown that its content of methane ranges from 50.6 percent to 97.3 percent, the average being around 80 percent.

In the smelting of iron ore there is required for the production of one ton of pig iron two tons of ore, one-half ton of limestone, one ton of coal and four tons of blast air, a total of seven and one-half tons of material. This yields five and one-half tons of waste gas.

It must be apparent, therefore, that at the high temperatures existing at the depth of a few miles below the earth's surface vast quantities of gas must be constantly driven off. It is the writers' belief that this gas is the cause of volcanic action, and the primary source of the natural gas and the petroleum found in the stratified rocks, forced there through faults and fissures into the 100 or more productive formations where they now are found.

Here let us examine into the nature of the gaseous emanations of volcanoes. The destructive eruption of Mount Pelee, Martinique, in 1902 was, without doubt, a terrific blast of inflammable gas which destroyed the city of St. Pierre, asphyxiating and burning 30,000 people. Eye witnesses from the vessels in the harbor of this catastrophe reported that a yellow, sulphurous cloud of smoke lay like a pall over the city.

Dr. Bernard R. Hubbard, the well-known Alaskan explorer, reported discharges of hydrogen sulphide gas from the Aniakchak crater in Alaska. Hydrogen sulphide is the well-known troublesome gas that is associated with the oil in many of the wells in West Texas.

Quoting from J. W. Judd's VOLCANOES:

> Among the most common substances emitted from volcanic vents along with the steam are the two gases, sulphurous acid and sulphuretted hydrogen. . . . Hydrogen and sulphuretted hydrogen are inflammable, and when they issue at a high temperature, these gases burst into flame the moment that they come in contact with the air.
>
> When the crystals embedded in granite, and in some lavas, are examined with the microscope, they are frequently seen to contain great numbers of excessively minute cavities. Each of these cavities resembles a small spirit level, having a quantity of liquid and a bubble of gas within it. . . . It has been estimated that in some instances the number of these minute liquid-cavities in the crystals of rocks amounts to from one thousand millions to ten thousand millions in a cubic inch of space.
>
> In many cases the liquid is water . . . in other cases the liquid is a hydrocarbon like the

mineral oil which is present in great abundance in deep seated rocks in many parts of the globe. But in some other cases the liquid is found to be the gas known as carbonic acid which under extreme pressure can be reduced to a liquid condition.

The presence of these liquids in the cavities of crystals clearly proves that the latter must have been formed under enormous pressure—a pressure sufficiently great to reduce, not only steam, but also volatile hydrocarbons and even gaseous carbonic acid, to the bulk of a liquid.

Professor Judd (Royal School of Mines, London) refers to the gaseous emanations from the mud volcanoes that occur in Northern Italy, Sicily, on the shores of the sea of Azof and the Caspian, in Central America and elsewhere. "Sometimes this gas is inflammable, consisting of sulphuretted hydrogen, hydrogen or some hydrocarbons, and these gases occasionally take fire."

Quoting from Professor I. C. Russell's VOLCANOES OF NORTH AMERICA:

Foque determined by analysis that immediately over the focus of eruption, free hydrogen formed 30 percent of the gases emitted, but that the proportion rapidly diminished with distance from the active vents and hotter lavas while at the same time the proportion of marsh gas and carbon dioxide rapidly increased.

The gaseous emanations collected by Foque were found to contain abundant free oxygen as well as hydrogen. One analysis gave the following:

Carbon dioxide 0.22, oxygen 21.11, nitrogen 21.90, hydrogen 56.70, marsh gas 0.07=100. This mixture on coming in contact with a burning body at once ignites with a sharp explosion.

Quoting again from Geikie:

In the present state of knowledge, all the geological energy upon and within the earth must ultimately be traced back to the primeval energy of the parent nebula, or sun.

Summarizing the foregoing it would appear that there are sufficient grounds for assuming the hypothesis that the hydrocarbons have been derived from the primordial gas that seems to have been the chief element of the earth when it was born, even though this gas may have condensed into rigid matter and, due to internal heat, has again reverted to gas.

The accumulation of oil along faults, as for example, the several oil fields that have been developed along the Balcones fault in Texas, furnishes evidence that the oil has been generated in the interior of the earth and has escaped upward along the fault plane to the stratified rocks where it has found lodgment.

Carrying this reasoning to a further conclusion, it is possible that the generation of petroleum is a continuous process, and that the hydrocarbons for the use of future generations are to find their way by means of new faults, caused by seismic, volcanic or other earth convulsions, to the sandstones and limestones that today are barren, but that years or centuries hence may be found to be productive.

▼

Background for Iraq Pipeline Construction

H. S. AUSTIN, director of pipeline construction, Iraq Petroleum Company, in a speech given at the Oil Industries Club Luncheon, London, early in January reviewed progress in construction and use of pipelines in the United States and the contribution that this experience as well as that gained in other countries would furnish in the construction of the huge pipeline from Iraq oil fields to the Mediterranean.

Mr. Austin pointed out that production having developed in the interior of the United States away from consuming centers, economical transportation required the development of pipelines. The first of these was built by Samuel Van Sickle in 1865 to carry Pennsylvania crude to the Allegheny River for transportation by water. Four miles in length, the line consisted of two inch diameter screwed pipe. By 1875 a 60 mile line of four inch pipe had been extended to Pittsburg from the Pennsylvania fields. By 1910 lines extended from all important fields of the Mid-Continent area, while in 1885 a pipeline had been completed on the Pacific coast. A new stage in the development of the use of pipelines was reached when the Pacific Coast Oil Company constructed an eight inch, 280 mile line from Kern River to Port Richmond for the transportation of a heavy viscous oil unlike the oil that had been transported by pipeline up to that time. By 1926 California possessed eight percent of the total pipeline milage in the United States.

In speaking of construction practice, Mr. Austin reviewed the progress that had been made from the days when individual labor dug trenches and laid screwed and coupled pipe. This method was improved upon by the introduction of pipe screwing machines which in turn necessitated a more rapid ditching and led to the use of ditching machines. Tractors, trucks and automobiles assisted in speeding up pipe laying and reducing the labor required for this work.

Earlier lines were uncoated, according to Mr. Austin, but did not suffer greatly thereby in the non-corrosive Pennsylvania soil. In the Mid-West, however, corrosion destroyed pipe within ten years and made coating necessary at the same time as decomposition by electrolysis raised a problem in the East. Protection against these forces was developed and seamless tubes with welded joints increased the pressure that could be carried in the lines. Gas welded joints came into use about 1920 and an advance was marked by the West Texas-Houston, all electric welded line laid down in 1928 with sections 70 to 80 feet in length, coated before leaving the factory. Electric welding progressed from low current welding to high current welding with covered electrodes.

Pump stations, which at first were operated by steam using coal for fuel, and hence had to be located near railroads turned to the use of oil as fuel under the boilers and finally to Diesel pumps. At present automatic, electrically controlled pump stations that would require only a watchman are being built.

Mr. Austin pointed out that the tremendous increase in oil production in the United States had necessitated this rapid development of the pipeline system which at present consists of 51,287 miles of trunk lines and 41,830 miles of gathering line.

Finally, Mr. Austin commented on the fact that the latest major project in pipeline construction was being undertaken in the country where the earliest evidence of the existence of petroleum had been found and that the Iraq line would benefit from the combined experience of several nations through its construction by an international company.

▼

GENERAL Petroleum Corporation will spend approximately $10,000,000 in 1933 for improvements on its various California properties. Work has already begun on the first units of its refinery program at Torrance to cost $1,500,000 and it is planned to construct a complete system of storage machinery, pumps, cooling systems and pipelines.

Foreign Oil Legion

J. B. AUG. KESSLER, joint managing director, Royal Dutch Shell, landed in New York, January 30 on the Europa.

▼

A. M. GRAY and Dr. P. S. Nisson, Gray Processes Corporation, sailed from New York on January 14 for Europe where they are making a study of refinery conditions.

▼

K. R. KINGSBURY, president, Standard Oil Company (California) sailed from Los Angeles for Honolulu on January 30.

▼

R. C. HOLMES, president, The Texas Corporation, and T. Rieber, vice president, have been in Europe since the middle of December and returned to New York early in February.

▼

Lt.-COL. H. C. B. HICKLING, D.S.O., M.C., general manager, Apex (Trinidad) Oilfields, Ltd., is at present on short holiday leave in England. The Colonel, who is also a member of the Legislative Council of Trinidad, is expected to return to the Island some time in February to resume his substantive as well as his legislative duties.

▼

JAMES A. MOFFETT, vice president, Standard Oil Company (New Jersey), returned from a brief visit to Europe, landing in New York January 30. Mr. Moffett had left New York for Europe earlier the same month.

James A. Moffett

R. I. WATSON, managing director, Burmah Oil Company, Ltd., is expected to return to London from India in March.

R. I. Watson

▼

P. M. FOWLIE, president and general manager, Shell Oil Company of Canada, returned to Toronto on January 20 from a trip to London and Amsterdam.

▼

Dr. R. E. HUMPHREYS retired on December 31 from his position as vice president in charge of manufacturing and director of the Standard Oil Company (Indiana) after thirty-three years of service. He is succeeded by Dr. Max G. Paulus, who becomes vice president in charge of manufacturing and Dr. Robert E. Wilson, vice president in charge of research and development.

▼

C. E. CAPITO, petroleum technologist, Trinidad Government, has returned to Trinidad after a visit to England.

▼

L. W. BERRY, field manager of Anglo-Ecuadorian Oilfields, has returned to Ecuador from Tulsa, Oklahoma.

ENGINEERS Alfredo Castelleti and Alberto Velano, representing the Italian government, are at present in Mexico making an intensive study of drilling and production methods, of distribution and marketing, and of refineries and pipelines. Their mission is a result of the Italian government's desire to develop her oil industry along modern, efficient lines.

▼

E. H. O. ELKINGTON, general manager Anglo-Persian Oil Company in Persia, has returned to Persia from leave in Britain.

▼

W. J. MCKEOWN and C. M. Staley, Standard Oil Company of New Jersey construction superintendents, sailed from Europe to New York on the President Adams last month.

▼

FREDRICK HAYES, National Transit Company with Mrs. Hayes, visited Paris for a fortnight after a visit to London last month.

▼

MAJOR G. H. SIMPSON, O.B.E., assistant general manager, Trinidad Leaseholds, Ltd., who had been spending a holiday in England, returned to Trinidad during the early part of January.

▼

E. W. DELACOUR, formerly advertising manager in South America for the Eagle Oil and Shipping Company, Ltd., has been appointed joint sub-editor of THE PIPE LINE, house organ of the Shell group of oil companies.

▼

A. M. MCQUEEN, vice president and director, and A. E. Burns, director, International Petroleum Company, Ltd., returned to Toronto, Canada late in January after a business trip to the company's properties in Peru and Colombia.

A. M. McQueen

Status of Roumanian Industry

(Continued from page 54)

some time ago has been of help, most directly to the fuel oil grades. The refinery quotation for export light gasoline, around 2,200 lei per ton, is increased by the railroad rate to something under 2,900 lei f.o.b. Constantza.

State influence is felt directly in the question of royalties, since 48.89 percent of the oil produced in Roumania last year came from state concessions. The average royalty (including mining tax) was about 16½ percent varying in different localities from 12 to 17 percent, except for one field, the smallest, where the rate was 5 percent. In terms of tonnage, the state's share was 4,835,635 bbl. out of the total of 22,780,471 bbl. produced on state concessions.

The state collects most of its royalties and mining taxes in actual oil, which it sells for its own account. Proceeds from such collections in kind amounted in 1931 to 221,800,000 lei, against only 15,500,000 lei paid in cash.

The state is an important seller disposing of over 10 percent of the crude produced in the country; on the whole, its business seems to have been handled in a manner which at least has not added to the market demoralization. There has been agitation in some quarters for a state owned refinery to handle this oil, but in view of the shortage of capital and the existing excess of refining capacity, it is considered unlikely that these proposals will assume concrete reality within the near future.

There remain, however, the problems of inadequate capital and of excessive taxes which confront the Roumanian producer. Now that the basis has been established for international cooperation toward the objectives of price stability and elimination of excess competition for markets, it is possible that these internal problems may be solved.

The ability of the Roumanian producers to come to an agreement last December on the detailed application of the agreement signed at Paris is reassuring in this regard. Every effort is being made to adjust the domestic industry.

▼

LIBRARY

DAS ERDOLPROBLEM IN FRANKREICH (PETROLEUM PROBLEM IN FRANCE), by Dr. J. G. Luria. 6 Reichsmarks.

In analyzing the petroleum problem as it concerns the French Dr. Luria starts off by noting that the great Anglo-Saxon oil concerns have been getting most of the publicity. Public interest in the proceedings of these giant organizations is largely due to the fact that the struggle for oil has often taken dramatic forms and that oil economics and politics have often been closely intermingled.

The relations between France and the great world-encircling Anglo-Saxon oil concerns are luridly sketched in the book now before us. Dr. Luria begins by examining the attitude of those in control of French policy in the pre-war period—an attitude founded on a misconception of the importance of oil in national well being; he then reviews for us the difficulties encountered by the French in procuring supplies of oil during the great war. The peak of these difficulties was reached about the beginning of 1918, when Premier Clemenceau sent an alarmed call to President Wilson of the United States. This appeal was not in vain; the Americans sprang into the breach. But the memory of those days, when a shortage of gasoline hung like a sword of Damocles over the head of the French nation, still persists in the minds of most Frenchmen, and it was not long before France began a feverish search for oil—at home, in the colonies, and in foreign countries. But neither at home nor in the colonies have any important sources of oil been found, and in the foreign countries the French found themselves forestalled by the Anglo-Saxons. For 15 years France has been carrying on a severe struggle against foreign domination of the world's oil industry. They have managed to increase the yearly production of their only field—Pechelbronn—to 500,000 bbl. which is a mere drop in the bucket in comparison with a yearly requirement of 28,000,000 bbl. But they have called into being a large fleet of oil tankers, and are compelling importers to carry a stock equal to three months' requirements. Their principal foothold in the foreign oil business is 23⅓ percent participation in the Iraq Petroleum Company. But, as Dr. Luria points out, this participation represents a rather shaky foundation for the national oil economy of France; as the author sees it, the struggles of the French to free themselves from the great oil concerns have not yet succeeded.

LE PETROLE EN ROUMANIE (PETROLEUM IN ROUMANIA), by Mihail Pizanty; published 1933 by M. Pizanty, Bucharest; 400 pages with 8 maps (one in color).

This book is the tenth of a series of annuals on the petroleum industry compiled by the industrious editor of MONITEUR DU PETROL ROUMAIN. The contents include a summary of the world petroleum industry for 1931 and most of 1932, but the bulk of the work is given over to a detailed exposition of the Roumanian industry. No pertinent fact about Roumanian oil appears to have been omitted. We are given an up to date account of the national oil legislation, the geology of the oil regions, and a review of current activities in production, transport, refining, consumption, exportation and the markets for Roumanian oil. Full lists are given of the various oil enterprises operating in the country, the personnel, the nationalities and the capital structures of the oil companies, their dividends and the market prices of their stocks, etc. Full details are given of the equipment and capacities of the refineries, the production by enterprises, fields and districts, and every enterprise and refinery is shown on one of a number of detailed maps. As a source of information about the Roumanian oil industry this book would seem to be indispensable.

THE GEOLOGY OF OIL, OIL SHALE AND COAL by Murray Stuart (104 pp. 7/6 d.). Although not strictly up to date, this book on the geology of oil is a fairly complete record of the process by which nature manufactures crude petroleum. It is an outline of the origin and accumulation of oil, shale and seams of coal. Deductions are based on established geological laws and every effort is made to simplify the conceptions of the formation of oil in the oil bearing strata.

UNITED STATES

	Daily Production bbl.	Daily Runs to Stills bbl.	Gasoline Stocks bbl.	Imports for week bbl.	California Shipm. East for week bbl.
Week Ending Dec. 31	1,712,765 shut-in*	2,085,000	52,339,000	1,337,000	172,000
Week Ending Jan. 7	2,039,672 299,872*	2,020,000	52,249,000	686,000	108,000
Week Ending Jan. 14	2,038,970 293,408*	2,071,000	52,264,000	691,000	488,000
Week Ending Jan. 21	2,015,300 284,950	2,190,000	53,650,000	1,253,000	162,000

Underlined figures indicate improvement in statistical position—decrease in production, runs to stills, gasoline stocks or imports.
*Production of the Rusk-Gregg field, East Texas.

Imports and Exports

DURING November, 1932, the fifth month after imposition of a tariff on crude oil and its products, total imports continued at a low level, amounting to but 3,173,000 bbl. as compared with 3,849,000 bbl. imported in the preceding month, and a monthly average of 9,090,000 bbl. for the first six duty-free months of 1932. Motor fuel imports continued nominal in November reaching only 121,000 bbl. as compared with 161,000 bbl. imported in October, and a monthly average of 1,272,000 bbl. for the first six duty-free months of 1932.

Petroleum exports for the month of November decreased noticeably under those of October, the total volume being 7,014,000 bbl., as compared with 8,035,000 bbl. exported in the preceding month, while motor fuel exports during November, 1932, remained unchanged at 2,387,000 bbl., as compared with 2,379,000 bbl. exported in October.

Thus the post-tariff trade readjustment favorable to domestic producers was extended into November. Reduction in motor fuel imports of 1,151,000 bbl. was counterbalanced by the reduction of motor fuel exports by 1,153,000 bbl., while the imports of all other petroleum products contracted by 4,766,000 bbl. during November, and their exports decreased by only 1,435,000 bbl., leaving a favorable balance of 3,329,000 bbl., or 111,000 bbl. per day.

Motor Fuel Supply-Demand

INDICATED domestic demand for motor fuel during November, 1932, averaged 1,010,000 bbl. per day, a decrease of 2.9 percent under the daily average of the preceding month, and 11,000 bbl. per day under the domestic motor fuel consumption in November of 1931, a decrease of 1.08 percent.

Exports of motor fuel averaged 80,000 bbl. per day in November, 1932, an increase of 3.9 percent over the preceding month, but 36.0 percent under November of 1931. Total demand for motor fuel in November, 1932, therefore decreased by 4.9 percent as compared with the same month of 1931.

On December 1 the motor fuel stocks at refineries, terminals and in transit amounted to 47,152,000 bbl., an increase of 112,000 bbl. as compared with stocks on hand on November 1, indicating the resumption of the seasonal additions to stocks. Runs to storage, however, were so small as to emphasize further the fundamentally healthy quantitative statistical position of the oil industry, and to show that the current difficulties are due entirely to such qualitative factors as the disorganization locally in producing, refining and marketing branches, which at the end of January, 1933, assumed grave proportions.

Refinery Runs Decline

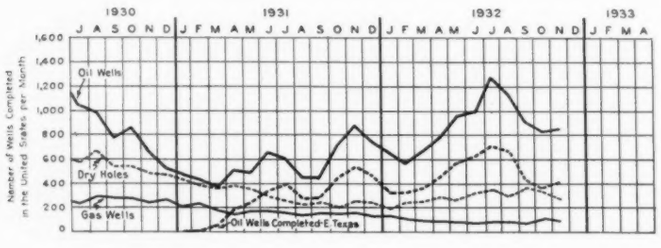
FOR THE TWO weeks ending January 14 and 21 crude oil runs to stills decreased considerably from the December, 1932, runs, dropping to 2,071,000 bbl. and 2,190,000 bbl. per day (Bureau of Mines) respectively, therefore more nearly approaching the figures recommended by various statistical committees, but still being in excess of currently declining demand, more particularly so if considering the unreported runs from smaller refineries in East Texas district and elsewhere.

Prices Continue Downward

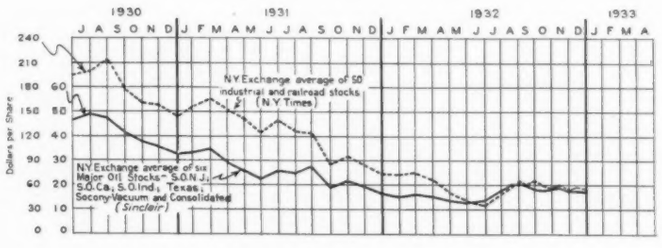
CRUDE oil and motor fuel prices further extended their December declines under the influence of chaotic conditions in the oil fields, in the legislative bodies of Oklahoma and Texas and in the marketing branch of the industry, as well as under the continued barrage of court injunctions. By January 20 all gains of the past year and a half were wiped out, 36 gravity crude oil in North Texas, Oklahoma and Kansas officially dropping to 44 cents per barrel and in the East Texas field to 50 cents per barrel, while in the latter field it could be bought for as low as 25 cents per barrel and in Oklahoma City field for as low as 35 cents per barrel. The refinery gasoline quotations established a new low record when demand declined to two cents per gallon in Oklahoma, and to as low as 1¾ cents per gallon in East Texas, or fully one cent a gallon under the prices quoted in July of 1931 when crude oil was selling at around 20 cents per barrel.

Effective January 16 the Standard

U. S. drilling: comparison of oil wells, dry holes, and gas wells.



Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.



Stations, Inc. (S. O. Ca.) reduced gasoline tank wagon and service station prices one cent a gallon in Los Angeles district.

On January 17 the Standard Oil Company of Indiana and the Shell Union Oil Corporation reduced gasoline tank wagon and service station prices one cent per gallon in Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, South Dakota and North Dakota.

On January 19 the Standard Oil Company of New York, the Standard Oil Company of New Jersey, the Gulf Oil Corporation and the Atlantic Refining Company announced an increase in commercial discounts from one to two cents per gallon, effective throughout the territories of the companies.

On January 23 the effect of the break in the motor fuel prices in the United States was felt in Canada, where on that date the Imperial Oil Company cut gasoline prices 1½ cents a gallon an all grades throughout the Dominion. The British motor fuel market felt the effect which appeared in the form of rumors of coming reductions in petrol prices, added to a situation that was already weak.

Refinery gasoline quotations on January 21 were at about their lowest:—2–2⅜ cents per gallon for 58–60 U. S. M., 57 and below octane rating, in Group 3, Oklahoma market; 57 to 64 octane rating, U. S. M., commanded 2⅜–2⅝ cents per gallon; and 65 and above octane rating, U. S. M., was quoted at 2¾–2⅞ cents per gallon. Gulf Coast prices for export declined by January 21 half-a-cent per gallon from the December 21, 1932, quotations, to 3½ cents per gallon for 58–60 U. S. M. grade.

Natural gasolines declined in sympathy with refinery gasolines fully one cent per gallon from the preceding month, and were quoted on January 21 at 2⅛ cents per gallon for grade 26–70 in Oklahoma and North Texas, and at 2½ cents per gallon in North Louisiana.

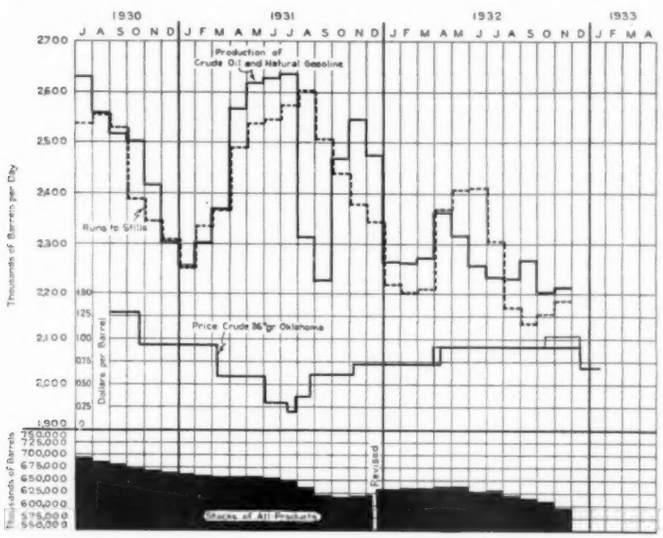
Kerosene prices were similarly unsettled during the past month, but lost only half-a-cent a gallon, grade 41–43 w.w. declining to 3–3¼ cents per gallon in Group 3, Oklahoma market; while Gulf Coast prices for export remained unchanged at 4¼–4⅜ cents per gallon for 41–43 p.w. grade.

New and Old Crude Oil Prices

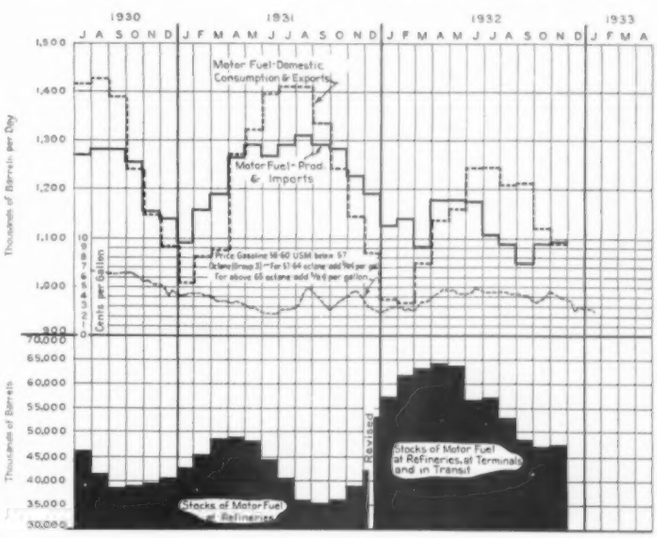
		October 15 not followed by S. O. N. J. & S. O. Ind.	December 15	January 17	January 17 Wilcox O. & G. Co. Based on Gasoline
		per bbl.	per bbl.	per bbl.	per bbl.
Okla., N. Texas	28 deg.	$0.88	$0.53	$0.28	
and Kansas	36 deg.	1.04	0.69	0.44	$0.32–34½
	40 deg. top	1.12	0.77	0.52	0.40–42½
East Texas	flat	1.10	0.75	0.50	
West Texas	flat	0.90	0.50	0.30	
Darst Creek	flat	0.85	0.60	0.35	
Gulf Coast	25 deg.	0.90	0.70	0.44	
(incl. Conroe)	30 deg.	0.96	0.80	0.54	
	40 deg.	1.10	0.88 34° top	0.62 34° top	
Smackover, Arka.	flat	0.75	0.50	0.40	
Rocky Mountains					
Salt Creek	36 deg.	0.92	0.69	0.44	
Elk Basin	flat	1.10	0.87	0.62	
Pennsylvania					Pennsylvania, Jan. 21
Bradford Distr.	flat	1.87	1.72	1.57	1.47
Eureka Lines	flat	1.52	1.37	1.22	1.12
Lima	flat	1.15	0.90	0.70	
Illinois	flat	1.10	0.87	0.62	
CANADA		November 3, 1931	January 10		
Petrolia		$1.90	$1.80	$1.60	
Oil Springs		1.97	1.87	1.67	

The crude oil prices in the Mid-Continent area continued to decline uninterruptedly after the December 15, 1932 cut, several of the smaller companies posting gradually lower and lower schedules, while the illegally produced crude oil was

U. S. production, runs to stills and price of crude oil in relation to stocks of all petroleum products.


1930
1931
1932
1933
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
Production of Crude Oil and Natural Gasoline
Runs to Stills
Price Crude 36° gr Oklahoma
Thousands of Barrels per Day
Dollars per Barrel
Thousands of Barrels
Stocks of All Products
Revised

U. S. consumption and exports, production, imports and prices of motor fuel in relation to motor fuel stocks.


1930
1931
1932
1933
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A
Motor Fuel-Domestic Consumption & Exports
Motor Fuel-Prod. & Imports
Thousands of Barrels per Day
Cents per Gallon
Thousands of Barrels
Stocks of Motor Fuel at Refineries, at Terminals and in Transit
Stocks of Motor Fuel at Refineries
Revised

being sold at almost anything the refiners were willing to pay. The Wilcox Oil and Gas Company, the Bell Oil and Gas Company, the Waggoner Pipe Line Company, the Danciger Oil and Refining Company, the Panhandle Refining Company, the Rock Island Refining Company and other smaller purchasers announced several reductions in crude oil prices beginning on January 6, and by the middle of the month it was estimated that some 150,000 bbl. per day of legally produced crude was selling 20 to 30 cents per barrel under the prices posted by major purchasing companies, while an undetermined volume of illegally produced oil was being sold at from 25 to 35 cents, or about 50 cents per barrel under the Humble-Stanolind schedule.

Major concerns were necessarily forced to follow the reductions of smaller companies and on January 18 the Stanolind Crude Oil Purchasing Company (S. O. Indiana) cut the price of crude oil in North Texas, Oklahoma and Kansas 25 cents per barrel. The announcement of the company read:

> The reduction in our crude prices is forced by continued unsatisfactory conditions in movement of crude. Many purchasers are already openly buying below our prices. Much bootleg crude is moving secretly at still lower prices. Fundamentally these conditions prevail because, with consumption of gasoline declining, production continues in excess of demand. Cheap crude is made into cheap products that have a far-reaching effect in demoralizing the market for refined products. Gasoline prices have been chiseled by cutting crude, by gasoline tax evasion, and by abnormally wide marginal contracts until they are lower today than they were when crude sold in 1931 at the lowest prices in many years. These conditions have developed in spite of the sincere efforts of the great majority of producers and purchasers to bring about sound conditions through proration. Unfortunately the small minority who care nothing for stability in the industry are able to exert a disproportionately large influence on the market, and there appears to be no effective way to protect business against their piracy except to meet the prices they create. We have repeatedly stated that we cannot pay more for crude than other purchasers do or more than can be realized on the finished products. We have never paid less than our posted prices for crude, and prices of products made from our crude have been lowered only to meet competitive prices already established.

The reduction initiated by the Stanolind Crude Oil Purchasing Company in North Texas, East Texas, Oklahoma and Kansas was followed by all other major purchasers and spread rapidly through the United States, except California.

It must be noted particularly that the new crude oil prices as posted by the Stanolind Crude Oil Purchasing Company are still 10 to 12 cents a barrel higher than Wilcox Oil and Gas Company's schedule based upon the price of refinery gasoline, and also some 50 percent in excess of quotations currently reported for illegally produced oil. It is apparent, therefore, that unless crude oil prices are generally stabilized at the new levels, and that unless the illegal production and production under injunctions is radically curtailed, further reductions are almost certain to take place in the near future.

Two Kansas companies, the Derby Oil and the Golden Rule Refining, joined the Wilcox Oil and Gas Company in paying a price for crude oil based upon daily refinery gasoline quotations, as published by the Chicago JOURNAL OF COMMERCE (reported in detail on pages 27 and 28 in the preceding issue of WORLD PETROLEUM).

Proration Difficulties in Texas and Oklahoma

THE EAST TEXAS field, as reported in the preceding issue of WORLD PETROLEUM, was ordered by the Texas Railroad Commission to be completely shut-in from December 17, 1932, to January 1, 1933, and no production from that field was officially recorded in that period of time. Unofficial reports, however, indicate a very considerable drop in bottom-hole pressures during the period of the shutdown in various sectors of the pool, more particularly in the North end, where a 30-pound drop was registered in some wells, thus suggesting that a number of producers were flowing large volumes of crude oil.

Numerous injunctions against the orders of the Texas Railroad Commission are being sought at this writing, the hearings having been set for January 24 in Fort Worth before Judge James C. Wilson. On January 7 the Etex Oil Company secured an injunction in the Ninety-fourth District Court in Dallas prohibiting the Texas Railroad Commission from examining its books, or entering the premises of the Southern Oil Refining Company which operates a refinery and a field gathering system in the East Texas field. In the Conroe pool in the Texas Gulf coastal area the Alpha Petroleum Company continued to violate proration orders under an injunction, producing about ten times its allowable; the Texas Supreme Court was asked by Attorney General James V. Allred to issue a counter-injunction restraining the company from violating proration orders of the Commission. On the whole an impasse has been reached when the total number of injunctions preventing the Texas Railroad Commission from enforcing its orders and of counter-injunctions preventing operators with injunctions from breaking the Commission's rules has reached such a number that their enumeration would require pages; while at the same time probably quite as many operators produce their wells in excess of allowables without bothering to secure injunctions against the Commission. Some estimates place the illegally produced oil in the East Texas field at as high a figure as 40,000,000 bbl. during 1932, or equal to about 30 percent in excess of allowables and of actually reported output; though such overproduction probably did not exceed 10,000,000 bbl., or 7.5 percent in excess of allowables, that production, however, being economically entirely sufficient to undermine the stability of crude oil prices throughout the Mid-Continent.

By January 19 it has been proposed in the Texas Legislature to repeal the recent Texas market demand oil proration statute, to authorize investigation of conditions in the East Texas field by a special House Committee, and to provide for cooperative "unit" development of oil fields in order to prevent the destructive drilling booms.

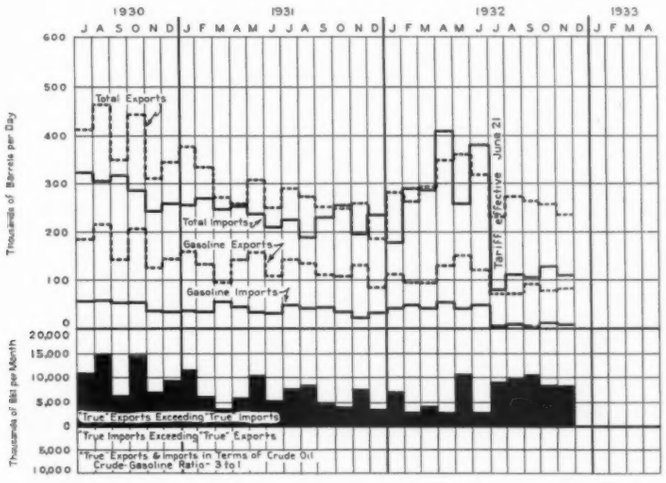
During the past month in Oklahoma proration enforcement events, investigations of proration, charges of graft and counter-charges by oil operators, oil companies, Governor of the State, Colonel Cicero I. Murray in charge of military enforcement, Corporation Commission, Tax Commission, State Legislature and others were a daily occurrence in Oklahoma; but the situation till January 21 remained fundamentally unchanged.

A new oil proration bill is under consideration and will be presented to both Houses of Oklahoma Legislature. Two clauses are likely to prove troublesome, one on military enforcement of proration as opposed to police, and the other on penalties for violating the Corporation Commission's orders.

Excess oil production in the Oklahoma City field was charged against Wirt Franklin, while the Anderson-Prichard Oil Corporation asked in Federal Court $100,000 damages from the Champlin

Refining Company for the drainage of oil from its No. 4 Roosevelt Place by the Champlin Refining Company's No. 1 McCalep which was flowing in violation of proration regulations.

The Oklahoma Senate Committee investigating oil proration, recently organized to investigate all phases of proration in Oklahoma fields, originally consisting of five Senators, three from the anti-administration group, was increased after a stormy Senate session to seven members on January 19, resulting in appointment of two additional pro-administration senators, thus giving Governor Murray a majority, whereupon the three anti-administration senatorial committee members threatened to resign. Later a resolution was introduced in the Senate calling upon the United States Senate to join in investigation of oil proration in Oklahoma.



Total U. S. imports and exports and gasoline imports and exports in relation to true exports exceeding true imports.

Rusk-Gregg: East Texas

THE STATE Corporation Commission in investigating proration in the Oklahoma City field was told that in the last 17-month period, from July 1, 1931, to December 1, 1932, gross production tax was paid to the State Tax Commission on 54,970,086 bbl., while only 51,335,395 bbl. were reported to the proration officials, an excess of 3,634,691 bbl. not shown on production records, and presumably produced in excess of allowables. Moreover the Tax Commission is investigating cases of non-payment of gross production tax and estimates that the total overproduction in the last 17 months has been about 6,000,000 bbl., or over 10,000 bbl. per day for the whole period under investigation.

Per well per day allowance in the East Texas field beginning with January 1 was adjusted to the bottom-hole pressures. Wells with a bottom-hole pressure of 1,000 lbs., or less, are allowed 28 bbl. per day; for each additional 100 lbs. pressure the well is allowed 0.6 bbl. additional allowable. Above 1,400 lbs. the allowable is 31.0 bbl. On the new basis the total allowance from the field is around 300,000 bbl. per day.

At the close of January there were in the East Texas field about 9,650 oil wells, an average of one well to 11.3 acres of its proven area. Cumulative recovery from the field reached around 240,000,000 bbl. by February 1, an equivalent of 2,181 bbl. per acre of the proven territory. New locations and completions, after falling off during Christmas holidays, again increased and continue to average around 50 per week each.

On January 6 the crude oil purchasing companies agreed to connect to some 300 unconnected oil wells in the East Texas pool, thus somewhat reducing the volume of distress crude oil seeking markets at any price.

Conroe: Texas Gulf

CONROE field continued to be the most active spot in the Gulf Coastal area. By February 1 there were in the pool about 160 producing wells and around 110 active operations, with new projects averaging 20 per week. Humble Oil and Refining Company (S.O.N.J.) owned at that time 70 producing wells and was drilling 35 wells, while the Tidewater Oil Company owned half interest in 20 producers and was drilling another 20 wells, and The Texas Company had six producing wells and was drilling 17 wells, these three companies accounting for 70 percent of completions and operations in the Conroe.

The allowable production in the Conroe field was reduced on January 19 from 180 bbl. to 158 bbl. per day from each 20-acre proven unit, with no allowance from more than one well on a unit, such method of proration having been initiated by the Texas Railroad Commission from the time of discovery of the pool in order to prevent such an excessive drilling campaign as was witnessed in the East Texas field under the former system of per well allowance.

The preliminary estimate of the possible cumulative recovery from the Conroe pool may be placed at this time at 100,000,000 bbl. to 150,000,000 bbl. from a total area of 10,000 to 15,000 acres.

The Tidewater Oil Company further extended its holdings in the Conroe by purchasing from George W. Strake a half-interest in 400 acres within the proven area of the pool, thus bringing the total acreage of the company in the Conroe field to 1,500 acres net. The Tidewater Oil Company has under construction a 43-mile 8-inch pipe line from the field to the Houston ship channel, from which point it will supply its eastern refineries.

Two wells of the Standard Oil Company of Kansas, No. 1 and 2 Madley, in the Conroe were burning on January 22, having caught fire on January 8. Difficulties are being experienced by the fire fighters because both wells cratered, swallowed derricks and all equipment and formed craters of considerable depth some 400 ft. in diameter.

Lucien: Central Oklahoma

THE LUCIEN field, a map of which was published in the October issue of WORLD PETROLEUM, was discovered on September 28, 1932, by the Lucien Consolidated Oil Company's No. 1 Wolf located in section 17-T20N-R2W when that well came in flowing 1,850 bbl. of crude oil per day from a total depth of 5,197 ft. Lucien Consolidated is a unit operating company of the Kettleman North Dome Association type.

At that time it was stated on page 439 of the October, 1932, issue of WORLD PETROLEUM that the discovery well—"missed great thickness of Mississippian and Siluro-Devonian sediments, thereby revising the sub-surface geology of Perry district and probably opening not only one major field in its immediate vicinity but possibly uncovering a buried pre-Pennsylvanian plateau of considerable importance." Developments of the last month substantiate the theory that a plateau of very considerable extent has been discovered. Lucien Consolidated Oil Company's No. 1 Jerome in section 8-T20N-

R2W, half-a-mile northwest from the discovery well, drilled to 5,223 ft. and flowed 1,500 bbl. in the initial 24 hours, declining to 1,200 bbl. in the second 24 hours, and was correlated on the Viola limestone 36 ft. lower than No. 1 Wolf, thus indicating that the field will not extend far in that direction. The third producer, being completed at this writing, the Stanolind Oil and Amerada Petroleum Companies' No. 1 Kolb in section 33-T20N-R2W, three miles south-southeast from the discovery well, was drilling at 5,000 ft. and was flowing by heads about 250 bbl. per day, and was correlated on the Viola limestone about 20 ft. higher than the discovery well.

It is evident therefore that the plateau, as known today, extends already 3½ miles north and south. The apparent lack of any profile in the Lucien field up-to-date is disconcerting, but structurally considerably higher portions of the field may yet be uncovered by drilling east of the present three producers. Under the circumstances it is very difficult to pass any judgment on the new pool. If all wells in the Lucien pool will continue to run as low as the original three producers and will not exhibit more pronounced truncation of the Simpson series then the field, though admittedly in a major class, is not likely to show very large wells, or high recoveries per acre.

The operators of the Lucien field themselves adapted very wide spacing of wells, one to 40 acres, contributing greatly to proration stability and economy.

The following ten companies are represented in the Lucien-Perry potentially proven area, including their proportionate holdings in the Lucien Consolidated Oil Company:

Sinclair-Prairie Oil Company (Consolidated)	3,920 acres
Gypsy Oil Company (Gulf)	2,880 acres
Stanolind Oil Company (S.O. Indiana)	2,560 acres
Shell Petroleum Corporation	2,340 acres
Twin State Oil Company (Sun)	1,760 acres
Magnolia Petroleum Company (Socony-Vacuum)	1,600 acres
Continental Oil Company	1,520 acres
Empire Oil Company (Cities Service)	1,340 acres
The Texas Company	1,200 acres
Carter Oil Company (S.O.N.J.)	960 acres

(Includes the whole indicated plateau, only part of which will produce.)

Western Kansas

ON JANUARY 17 the Reeser, Ross and Lee No. 1 Well in section 4-T22S-R3W, halfway between Nickel and Hollow fields, was completed for about 2,000 bbl. per day from Hunton limestone with a total depth of 3,507 ft.

BASIL B. ZAVOICO

RUSSIA

Official Figures of Soviet Oil Operations*

	Crude Production (Bbl.)	Daily Average (Bbl.)	Run to Stills (Bbl.)	Drilling (Feet)
January	13,059,900	421,300	11,927,882	152,533
February	12,194,000	420,482	11,428,900	193,185
March	13,852,300	449,197	12,886,700	240,433
April	13,101,200	436,707	12,737,200	250,854
May	13,437,200	433,461	13,057,800	262,295
June	12,971,700	432,390	12,917,100	248,138
July	12,929,400	416,884	12,256,300	222,342
August	12,721,800	410,380	11,725,700	171,665
September	11,598,300	386,610	11,021,500	189,298
October	11,928,700	384,797	11,179,700	184,880
November	11,022,900	367,430	10,472,000	158,670
December	10,908,100	351,874	10,499,300	162,025
Total 12 mo. 1932	149,725,500	409,086	142,110,082	2,436,318
1st Quarter 1932	39,106,200	414,380	36,243,482	586,151
2nd Quarter 1932	39,510,100	429,738	38,712,100	761,287
3rd Quarter 1932	37,249,500	404,886	35,003,500	583,305
4th Quarter 1932	33,859,700	368,040	32,151,000	505,575

Revised Quota 1932—181,800,000 bbl. or 525,400 bbl. daily average

*Crude oil conversion ratio: seven bbl.-one ton.

CRUDE production during 1932 fell below the figure for 1931 by about 6.5 percent and about 15 percent below the quota established by the Five Year Plan. The Soviet oil industry has encountered serious obstacles during the entire year 1932. Curtailed importation of equipment owing to lack of funds or credit facilities has proved a considerable handicap while the domestic machine shops were not in a position to supply all the equipment requirements of the oil industry. Scarcity of food and other living commodities has tended to accelerate labor turnover while the inadequacy of rail and water transportation has hampered the oil industry both in getting supplies and in shipping products.

Exports

EXPORTS of Soviet oil products continued to increase amounting to 37,898,500 bbl. in the first ten months of 1932 as against 33,298,725 bbl. for the corresponding period of 1931.

Soviet Exports by Products
(Barrels of 42 U. S. Gallons)

	1932 Jan. 1—Oct. 31	1931 Jan. 1—Oct. 31
Crude oil	3,280,500	2,577,495
Gasoline	13,755,175	11,931,400
Kerosene	4,999,918	4,095,800
Lubeoil	1,083,625	1,330,725
Gas- and fuel-oil	14,456,540	12,940,475
All other	322,710	422,835

It is expected that total exports of Soviet oil products in 1932 will aggregate 45,000,000 bbl. against 40,000,000 bbl. in 1931. A large proportion of the increase in exports during 1932 consisted of crude and fuel oil and presumably comprise the increased exports to Italy, Spain, France and Japan which are made up mostly of dark products. An increase is also to be noted in the export figures for gasoline owing probably to increased importations of Soviet products into Germany where the proportion of Soviet oil products imported increased from 11 percent in 1931 to about 25 percent in 1932. Russian oil exports to Great Britain fell considerably during 1932. The total will presumably amount to about one third of the 1931 exports.

Events of the month

MOSCOW. A cable has been received from Vostockneft addressed to Messrs. Stalin, Molotov, Head of the Council of Commissars, and Ordzonikidze, Commissar for Heavy Industries, stating that after three years of intensive exploration, oil has finally been found in the east of Russia. Several wells in the Ural fields are producing a high grade crude. The Sterlitamak location embraces a large area where the oil formation is estimated to be about 650 ft. wide and contains high quality crude. Oil fields along the Volga and on the shores of Lake Baikal are yielding commercial quantities of high quality crude. The

Bashkir republic oil lands consist of some 15 square kilometers in area with oil-bearing strata about 500 to 600 ft. below the surface.

Production, Runs to Stills and Drilling 1931–1932

(Barrels of 42 U. S. Gallons)

	Actual Results		Plan	
	1932	1931	1932	1931
Crude production	149,725,500	156,904,390	181,800,000	192,500,000
Daily average	409,086	429,878	525,400	527,400
Runs to stills	142,110,082	133,669,200	176,000,000	173,250,000
Drilling (feet)	2,436,318	2,331,310	3,350,000	3,000,000

Grozni. The Second North Caucasian Conference of Petroleum Geologists took place in Grozni at the beginning of December. I. Gubkin opened the Conference and reviewed the achievements of geology in Soviet Russia during the past 15 years. The Conference considered immediate problems of exploration of new oil fields and discussed further details of the Second Five Year Plan which will be submitted to the next session of the All Russian Congress meeting in January.

Reports from Baku state that storage facilities are taxed to capacity as a result of the closing of water transportation on the Caspian Sea for the winter and the resulting strain on inadequate rail facilities. Sufficient tank cars are not available at Baku and efforts have been made to route oil shipments to Makhatch Kala, across the Caspian to Krasnovodsk where the oil is again shipped by rail. This system is, however, proving unsatisfactory.

Refineries Brought Into Operation During the First Five Year Plan

	Capacity per annum in barrels
Baku:	
3 Badger pipe stills	7,260,000
1 Graver pipe still	2,770,000
1 German type pipe still	1,275,000
2 Domestic pipe stills	3,815,000
1 Max Miller bright stock plant	280,000
2 Domestic shell stills	5,970,000
Batum:	
4 Foster Wheeler pipe stills	7,200,000
1 German shell still	6,300,000
Grozni:	
2 Foster Wheeler pipe stills	5,970,000
1 Badger pipe still	1,400,000
2 German pipe stills	5,800,000
Tuapse:	
1 Domestic 14 battery shell still	6,300,000
1 German shell still	5,200,000
Yaroslavl:	
1 Domestic shell still	1,600,000
Cracking Units	
Baku:	
4 Winkler Koch units	2,100,000
1 Domestic Kapelushnikoff unit	210,000
Grozni:	
9 Winkler Koch units	8,400,000
1 Vickers unit	750,000
Batum:	
6 Winkler Koch units	4,200,000
Tuapse:	
2 Winkler Koch units	2,100,000
Yaroslavl:	
1 Winkler Koch unit	700,000

A geological survey and exploratory drilling are contemplated as a result of reports received by the Leningrad Petroleum Institute that evidence of oil has been found in the Yura formations of the Kstut Zauraksk coal mines.

Sverdlovsk. Two wells recently opened at Sterlitamak are yielding between 1,400 and 1,600 bbl. of crude oil per day. As no storage facilities have been provided in the field it has been decided to build a pipe line to the nearest river bank where storage will be erected.

An 8 inch pipe line is at present being built from the Upper Chussoff village oil field to the oil terminal of Uralneft on the Ural railroad.

Machine and repair shops are being built and personnel trained to take care of the requirements of the drilling division of Vostockneft on Lake Baikal.

A first shipment of 56,000 bbl. of crude from the Uktha fields is expected from Petchora at Archangel. It is reported that work on a river terminal will begin at Petchora through which all oil from the Uktha field will pass.

A flowing well has been completed at Neftdag at a depth of 80 ft. yielding 700 bbl. of crude per day.

Chimion field of Middleasia has completed the scheduled 1932 production twelve days before the end of the year and by January 1 exceeded its quota by approximately 3,000 bbl.

In the January issue of World Petroleum on page 30 a Tass message reporting a contract for delivery of 7,000,000 bbl. of petroleum products from Soyuznefteexport to Western India Oil Distributing Company, quoted the message as including oil products "except gasoline." This statement should have read "except kerosene."

Leaders Outline Second 5-Year Plan

Following a year that was in many respects disappointing for the Soviet oil industry, but in which despite difficult obstacles much progress has been made, Russia enters upon the Second Five Year Plan. At this important juncture the heads of several of the leading oil trusts have expressed their opinions on the future prospects of the Soviet oil industry and the specific part that the trust under their control will play in the accomplishment of the plans and quotas of the 1933 to 1937 period.

M. v. barinoff at the head of the Azneft oil trust outlined plans for this important group of fields and refineries as follows:

The geography of the Baku oil fields during the Second Five Year Plan will remain practically unchanged while all the new regions which have been explored recently and prepared for operation under the provisions of the Second Five Year Plan are all adjacent to the old oil fields of Baku. The new regions are Lockbatan, Kala, Ker Ges, etc., and the only region which will require the building of a new base during the Second Five Year Plan period is the district of Aliatsk. The sands of this location have been proven as oil bearing and owing to the fact that the district is located between the Caspian Sea and the Caucasian railroad, the building of a base will not entail difficulties.

The Baku oil fields will have to produce during the year 1937 a quantity of 124,000,000 bbl. of crude oil and the number of oil wells under operation in 1937 will amount to 7,000. At the end of the Second Five Year Plan period crude production of the Baku oil fields will consist of 25 percent flowing production; 34 percent of the total will be produced by means of compressors, and 41 percent by deep well pumping. During 1937 a total of 20,790,000 ft. will be drilled, 35 percent in new territory. About 50 percent of all wells drilled will reach depths below 4,000 ft. About 35 percent of all drilling in 1937 will be operated by the Kapelushnikoff turbine drilling method.

Refining capacity of the Azneft plants at Baku and Batum will grow from 94,500,000 bbl. at the end of 1932 to 112,500,000 bbl. in 1937 and particular attention will be given to lubricating oils for the domestic markets and for export. Of the other important problems which the Baku oil fields are facing, transportation is of utmost significance. The plan, which calls for the erection of a number of refineries at several places along the Volga River, will enlarge the quantity of oil and products to be shipped to the Volga region from the fields of Baku to about 126,000,000 bbl. in 1935 against 70,000,000 bbl. in 1932 and in order to facilitate the larger turnover it has been decided to shift the Baku sea terminal to a point at Apsheronsk which is beyond the freezing line on the Caspian Sea about 50 miles north of

Makhatch Kala. Adequate enlargements are also to be made in the harbor facilities at Astrakhan enabling shipping operations to continue between Baku and Astrakhan throughout the winter which is tantamount to an increase of the fleet capacity of about 25 to 30 percent.

F. P. CHAMROFF in speaking of Grozneft said:

The oil division of the Commissariat for Heavy Industries has set the production figures of the Second Five Year Plan for Grozneft at 94,500,000 bbl. in 1937 with a total of 385,000,000 bbl. for the period. The Grozneft administration has made a counter suggestion to increase production in 1937 to 143,500,000 bbl. at an unchanged total for the period. Grozni is expected to bring under production 12 new oil regions and in addition extensive exploration is being carried on at present of the lower sand strata of the Maikop formations along the Daghestan coastline of the Caspian Sea where the regions of Izber Basha and Atchi Su are of very favorable geological structure and seem to be promising as oil fields of commercial value for the future. Total drilling for exploitation and exploration will amount to 1,221,000 ft. Extensive reconstruction of equipment and technique will be undertaken and applied particularly to exploration drilling where all new methods of geological survey will be employed. Kapelushnikoff turbine drilling will be applied at the rate of about 33 percent of the total in 1937. In 1937 flowing production will amount to 31 percent of the total, 50 percent will be produced by air and gas lift and 19 percent by pumping. Almost all of the gas available at the fields will be fully utilized, some of which will be used as fuel and the balance will be processed for natural gasoline and carbon black. Grozneft will run to stills an average of 84,000,000 bbl. of crude per annum while important changes and improvements will be made in the refining end of the Grozni oil industry. A general reconstruction of the refineries will take place which will not so much tend to increase the refining capacity of the plants as to improve upon the methods applied for rectification and efforts will be made to increase the yield of white products and to improve upon the quality of all products obtained. Twenty-six cracking units will be erected by the Grozni oil trust. Total capital investment in Grozni during the Second Five Year Plan period will amount to 1,272,300,000 Rbl.

A. F. NESTEROFF (Maikop):

Maikop oil field will produce 168,000,000 bbl. of crude during the Second Five Year Plan period for which the drilling of 4,339,500 ft. will be required. All of the drilling will be done by means of the rotary system. A system of roads will be built at Maikop in order to make the oil locations accessible and the fields will be provided with transport facilities. Of the total crude production the greater part will be obtained from flowing wells and compressor production, pumping being applied to stripper wells only. Most of Maikop oil wells are at present under flush production with 66 percent of the same operating as gushers and 34 percent under gas lift. The refineries of Krasnodar and Armavir will process 98,000,000 bbl. of light and heavy crude and the refineries at Tuapse will handle 67,550,000 bbl. About 17,500,000 bbl. of Kaluseshk crude will be run at Krasnodar for asphalt and Armavir will process paraffin crude only. At the end of the Second Five Year Plan Maikop will employ 15,000 workingmen and 352,000,000 Rbl. will be expended for capital investment. Of this sum 290,000,000 Rbl. will be spent for reconstruction and enlargement of the drilling division and of its inventory and 62,000,000 Rbl. will be spent on erection and enlargement of refineries.

J. V. LAVRENTIEFF (Embaneft):

Most beneficial for the development of Emba will be the Caspian Sea Orsk-Kurgan pipeline, the first link of which up to Orsk will come under operation at the end of 1933. Large refineries are to be erected at Orsk and Kurgan. Some 45,500,000 bbl. of crude are to be produced by the Emba oil fields in 1937 and the total crude for the period of the Second Five Year Plan produced by all oil fields of Emba will amount to 105,000,000 bbl. It is true that little has been done for the exploration of Emba, but we have reliable indications that the total deposits of the field are worth over 2,800,000,000 bbl. of crude and a large program of exploration operations has been provided for Emba by the Second Five Year Plan. All modern methods of geological research will be employed in the fields and deep drilling will be distributed over a large area with very little wildcatting. It is necessary to realize that Emba-Ural is a vast desert steppe which is inaccessible because of lack of any kind of roads and has a sparse population because of lack of water. Living conditions, water and transportation are the most important problems of Emba and the following measures will be taken during the Second Five Year Plan period:—

1) A railroad will be built between Alexandroff Gai and Chardsui, the first link of which between Alexandroff Gai and Dossor will be under operation not later than in 1935.
2) A number of small connecting lines will be built between main points of the railroad and the oil fields.
3) A water supply system will be extended into the interior from the Ural River.
4) The native population will be trained for the formation of operating teams for the fields and refineries.
5) Radical improvements of living conditions will be undertaken during 1933–1934.

K. S. BUTCHATSKI (Vostockneft):

A well developed oil industry in the eastern regions of the country has a definite value and apart from oil at Sterlitamak very positive indications have been found in the lower Volga districts along the Sok River near Sizran and at Orenburg in the village of Kairov. Further oil locations have been definitely established at Cheredin in the northern Urals and at Yakutia as well as on Lake Baikal. Over 19,800,000 ft. will be drilled by Vostockneft in exploration and exploitation during the Second Five Year Plan period with a total production of 14,000,000 bbl. of crude during the period. Total capital investment during the period 1933–1937 will amount to 359,000,000 Rbl. of which 40,000,000 Rbl. will be spent in 1933 for drilling equipment.

J. S. SADZIKOFF (Middleasia):

This region is three times the area of North Caucasus and oil has been discovered in numerous locations. About 60 locations are to be explored during the Second Five Year Plan period. Aerial photo exploration will be applied. Thirty-seven topographical, 68 geophysical and 70 geological expeditions will be sent out in the prospective fields of Middleasia and over 36,300,000* ft. of drilling will be done which will include 13 wells to be operated immediately, all other drilling to be for exploration. The crude of Middleasianeft will be run to stills at Orsk and Kurgan where refineries are to be built. The first unit of refineries will consist of a pipe still with cracking facilities to be ready at the beginning of 1935, three more units with cracking facilities will be ready at the beginning of 1937 and one pipe still plant with cracking facilities will be ready at the end of 1937. A total of 300,000,000 Rbl. will be spent by Middleasia during the period, of which 183,000,000 Rbl. will be spent for drilling and drilling equipment.

J. J. SOKOLIANSKI (Turcomanstan):

Two gushers have already been opened at Neftedag of which one is at present yielding 35,000 bbl. of crude per day. Other locations under exploration for oil which are promising commercial value are Cheleken, Shikisliar and Keemir of which Cheleken is already producing oil. The number of oil locations in the region by 1937 will be 37 of which at least 20 locations are expected to be under actual production and the others will be under preparation. Over 33,300,000* ft. will be drilled. At present all drilling in the oil fields of Turcomanstan is being done by standard tools and rotary drilling is being gradually introduced. The total crude production during the Five Year Plan period will amount to over 35,000,000 bbl. The total capital investment in Turcomanstan oil trust during the Five Year Plan period will amount to 368,000,000 Rbl.

N. J. SHGENTI (Gruzneft):

Although 50 oil locations have been established in Georgia, only two are under exploitation at present at Mirsaani and Shiraki where 18 wells have been drilled to date. Average crude production of a well of the Gruzneft fields is 35 to 40 bbl. per day from a depth of 900–1,200 ft. The Mirsaani and Shiraki minor regions which are under production cover an area of about 600 hectares where between 500 and 600 wells will be drilled for a daily average of 70 bbl. of crude production. The deposits of the oil fields are estimated at 70,000,000 bbl. The expected crude production in 1937 will amount to 14,000,000 bbl. of which Mirsaani and Shiraki will yield 11,900,000 bbl. The drilling will total 4,207,500 ft.

J. WEGRIN

***Figures are extremely high for these regions and may be inspired by hope rather than actual expectation—Editor**

▼

SUCCESS in the efforts to adjust the dispute between the British and Persian Governments over the Anglo-Persian Oil Company's concession appears to be in sight as both parties are reported to have accepted the plan advanced by Minister Eduard Benes of Czechoslovakia that the matter of the cancellation of the concession should be submitted to private arbitration and a new arrangement between the company and the government be negotiated.

MEXICO

Taxation

IN AN EFFORT to protect the national petroleum industry and at the same time to avoid price increases on the domestic markets for these commodities, Provisional President, General Abelardo L. Rodriguez has established import levies of about 5.6 cents per barrel on gas oil; some nine cents per barrel on gasoline, and about 4.7 cents per barrel on illuminating mineral oil. The special taxation department of the Ministry of Finance will designate the customs ports through which importers must receive these products. Those who fail to comply with this requirement must pay an extra levy of about 8.25 cents per barrel on gas oil and approximately 20 cents per barrel on illuminating mineral oil. The department will establish monthly quotas for each importer of gasoline.

State governments will continue to receive one third of the 5.56 cents per gallon gasoline consumption on amounts of that commodity which are consumed in their territories, announces the Ministry of Finance in denying Mexico City press reports that the commonwealth's share of this levy would be reduced.

Automobile license fees have been abolished but their place has been taken by a 1.89 cents per gallon additional tax on gasoline in the Federal District, which includes Mexico City and has a population of 1,300,000. The levy, introduced as a means of saving the District municipal government expenses and motorists the bother of paying fees, increases the gasoline use tax in the District to about 9.45 cents per gallon. License plates, which are still being provided only cost the motorists the actual manufacturing expense.

Pipeline Concession Authority Transferred

AN AMENDMENT to the new general communications law, approved by the federal chamber of deputies, removes from the jurisdiction of the Ministry of Communications and Public Works and places with the Ministry of Industry, Commerce and Labor the granting of concessions for the construction of oil pipelines and the supervision of the operation of such works. The law considered pipelines to be communication means and placed them under the jurisdiction of the communications ministry. The federal government felt that the interests of all concerned would be better served if the labor ministry had authority over such works as it handles all matters pertaining to petroleum.

Mexican Eagle Obtains Injunction

APPLICATION for an order restraining the federal government from cancelling an agreement it made with Mexican Eagle Oil Co. under which the company would clear the Coatzacoalcos River, Vera Cruz state, of sand bars and otherwise make the stream completely navigable has been made by the oil concern to a Mexico City federal district court judge. The company declared in its petition that the federal government agreed to exempt it from production and other taxes to the amount it would spend in this work. Company asserts that the government not only nullified the agreement but has refused to reimburse it for more than $433,-333 it spent in the undertaking. The court has taken the petition under advisement.

Drilling

OHIO-MEX OIL COMPANY has resumed drilling on a well in northern Tamaulipas state near the United States border. When the well reached a depth of 240 ft. on November 24 last, it caught fire from an undetermined cause and the blaze destroyed a $35,000 steel derrick. The well was producing more than 1,000,000 cu. ft. of gas daily at the time of the fire. This is the shallowest gas well that has been encountered in Mexico.

Mexican Eagle Oil Co. (Royal Dutch Shell) has brought in its 24th well in the El Burro fields, Isthmus of Tehuantepec, Vera Cruz, at a depth of 2,700 ft. and with an initial daily production of 251 bbl., announces the petroleum department of the Ministry of Industry, Commerce and Labor. The department reports that company has begun drilling its 25th well in the El Burro zone and its 101st well near Chapacao, Panuco municipality, Vera Cruz.

Construction

AN ENTIRE town is being moved in Vera Cruz as the Mexican Eagle Oil Company (Royal Dutch Shell group) decided that Costa Rica was a better location for its headquarters in that sector than is Palma Sola. Company houses, pump station offices, warehouses, oil storage tanks, etc., are being shifted the some 14 miles.

Huasteca Petroleum Company (Standard of Indiana) will make a test hole to ascertain the nature of the terrain in land in the center of Mexico City which has been acquired by the oil company. The Huasteca Company proposes to erect a four-story building on the site. The ground floor of the edifice would be devoted to a super service and gasoline station, the next two floors to the general offices of the company in Mexico City and the top floor to apartments for executives and other employees of the enterprise. Hank Parkhurst, chief of the company's service department, is drawing up plans for the projected building.

DOUGLAS GRAHAME

▼

ROUMANIA

WITH THE single exception of the I.R.D.P. company all important Roumanian oil companies signed the domestic agreement for the restriction of production on December 31. The I.R.D.P. claiming a quota of 4,900 bbl. against their present production of 2,800 bbl. daily was omitted in view of the fact that the agreement was for restriction rather than increased production. The larger companies acting as buyers and carriers of crude hope to be able to enforce the restriction program against those who refuse to join the agreement.

Roumanian production under the new agreement will be decreased 60,620 bbl. per day. The more important producers have been allotted quotas as indicated in the accompanying table.

Roumanian Allowable Production

Company	Barrels Per day
Astra-Română	20,650
Steaua-Română	20,300
Româno-Americana	12,950
Unirea	14,490
Concordia	16,590
Creditul Minier	10,360
Colombia	6,230
Prahova	4,900
Sondrum	2,310
Other companies	20,720

It remains for the Roumanian refiners to reach a similar agreement as at present the quantity of crude considered indispensable for the refineries is considerably in excess of the allowable for the whole country. The first weeks in January have been spent by refiners in considering this problem. During these discussions it has been agreed that none of the refiners should attempt to buy crude thus creating competition in which the smaller refiners might lose out. All crude during the first weeks of January is being bought by a broker, prices established in relation to F.O.B. Constanza prices, and distributed according to the needs of the refiners. As in the production agreement, the Petrol-Block, controlled by I.R.D.P., has not joined the discussions of the refiners.

The attitude in Roumania is not over-optimistic in regard to the possibility of an agreement between the refiners and at the same time there is a possibility that the production agreement may yet be abandoned because of the completion of several important producers by outside interests. In view of the steady progress made to date, however, there seems a fair prospect for the eventual stabilization of the domestic Roumanian situation. The larger companies have an assured quota of 106,400 bbl. per day while all the smaller companies have been assigned a total allowable of 23,030 bbl. daily from which must be deducted a quantity equivalent to the production of outside interests not at present in the agreement. The reduction in the amount produced by the smaller companies amounts to 18 percent with prospects of an even greater decrease becoming necessary as outside production develops.

Two immediate difficulties confront the Roumanian industry. First, a test of potential is to be carried out on the wells of the smaller companies included in the 23,030 bbl. per day allowable. If this test should reveal a potential of 35,000 bbl. per day, as is feared in some quarters, it is possible that some of the smaller companies would no longer be willing to abide by the internal agreement for the restriction of production to meet the requirements of the international agreement unless the large companies were willing to sacrifice part of their allowable.

The second danger arises from the completion of a 3,500 bbl. per day well at Rasvad, Gura-Ocnitei field by an independent Canadian driller, Mr. Van Sickle. The well has been choked in to produce 2,520 bbl. per day but it is felt that it represents a threat to the Roumanian restriction agreement as it would necessitate a further restriction on the part of the small companies.

E. I. MARGULIUS

FINANCE

New York: January

FAILURE of Congress to make any progress in reaching an accord with respect to important legislative problems has been reflected in a period of extreme dullness in all markets with prices backing and filling in a narrow area. Practically all hope of any legislation being passed in the present session designed to bring about governmental economies and increase revenues in an effort to balance the national budget has been abandoned and the special session which will probably convene in the early part of April will be faced with this problem as its most important consideration. An unbalanced budget is the most serious obstacle in the way of business recovery as it means that the government must continue to finance its deficit by the sale of new securities and thus divert capital funds which would ordinarily flow into legitimate business channels. As long as the government continues to compete for private capital new financing of private enterprise must necessarily continue at a low ebb.

Although the House passed the farm allotment bill providing for a bounty on a number of farm products (at the expense of the consumer) considerable opposition has developed in the Senate to the form of the bill as passed by the House, and it is very unlikely that the bill will be enacted into legislation in the present Congress.

The oil industry has witnessed a widening of the price cutting movement to all important fields. Unless there is a reversal in the trend of prices before the end of the first quarter the industry will be faced with inventory write-downs, and earnings statements covering the first quarter operations will make unfavorable comparisons with the same period of 1932. Reports for the fourth quarter of 1932 will be available shortly, and in view of the fact that weakness in the price structure was already well underway before the end of the quarter it appears likely that the showing of the industry will be less favorable than earlier results would have indicated.

DIRECTORS of the Standard Oil Company of New Jersey announced on February 1 omission of the 25 cent per share extra dividend but declared the regular quarterly dividend of 25 cents. A statement issued by the company pointed out that use of past earnings for dividend payments could not continue indefinitely.

ONE OF THE principal barriers to the sale of the properties of Richfield Oil Company has been removed by settlement of the government's claim against the Pan American Petroleum Company, subsidiary of Richfield. A compromise agreement has been reached to settle for $5,001,500, the government's judgment of $9,277,666 for oil taken out of the Elk Hills leases. In addition, the compromise settles a general claim of $17,000,000 which Pan American may have pressed against Richfield, and eliminates a smaller claim exceeding $1,000,000 the government may have had against Richfield. The general committees are now free to present tentative offers for acceptance by bondholders and creditors.

FORTHCOMING report of Seaboard Oil Company of Delaware for the year ended December 31, 1932, is expected to show net profit of approximately $870,000 after all charges, which would be equivalent to 70 cents a share and would compare with net profit of $123,711, or 10 cents a share

New York Stock Prices

1932-33 High	1932-33 Low	Current Div. $ per Annum	Stock (Par Value $)	Dec. 19, 1932 to Jan. 21, 1933 Sales (Shares)	First	High	Low	Last	Net Change[1]
21⅞	8⅝	1.00	Atlantic Refining (25)	37,200	16	17¼	15⅜	15¾	.....
7	3⅜	....	Barnsdall 'A' (25)	45,600	4	4	3⅜	3⅞	− ⅛
1¼	¼	....	Colon Oil (No)	6,200	⅜	½	¼	½	+ ¼
9	4	....	Consol Oil (No)	121,200	5½	5⅞	5	5¼	− ¼
9⅜	3⅝	....	Continental Oil (No)	53,000	5⅝	6¼	5¼	5¾	+ ⅛
3⅛	1¾	....	Creole Petroleum (No)	19,600	2⅝	2⅞	2⅝	2⅝	.....
44¾	23	....	Gulf Oil Corp. (25)	16,500	27¼	29¼	26½	27¼	− ¼
55	35⅝	2.00	Humble Oil & Ref. (25)	4,500	45	45	43¼	44	−1
10⅞	6¼	0.50	Imperial Oil, Ltd. (No)	16,300	7⅜	8¼	7¼	7⅝	.....
2¾	1	....	Indian Refining (10)	4,300	2	2	1⅞	1⅞	.....
12¼	8	1.00	International Petr. (No)	27,600	10	10⅞	9⅞	10½	+ ⅝
11	5	0.40	Ohio Oil (No)	48,300	6¾	7⅛	5¾	6⅝	− ½
14½	7¼	0.80	*Pan Amer. P. & T. 'B' (50)	1,000	12	12⅜	12	12⅜	+ ⅜
8½	2	....	Phillips Petr. (No)	67,700	5	6	4½	5½	+ ½
6½	2⅞	....	Pure Oil (25)	25,600	3⅝	3⅞	3	3⅜	− ⅛
1⅝	¼	....	Richfield Oil (No)	4,500	⅜	½	⅜	½	+ ⅛
23¾	12⅛	†0.81	Royal Dutch N. Y. (13⅔)	9,900	19¼	21⅝	19⅛	20⅛	+1¼
20⅜	6⅝	0.40	Seaboard Oil (No)	35,700	18⅝	20⅜	17⅜	17½	.....
8¾	2½	....	Shell Union (No)	56,600	5⅜	5⅝	4¼	5	− ½
5¾	2½	....	Skelly Oil (25)	6,900	3⅝	3¾	2⅞	3¼	− ⅝
12¼	3¼	0.40	Socony-Vacuum (25)	207,600	7⅜	7⅞	6¼	7⅛	−¾
31⅞	15⅛	2.00	Standard Oil of Calif. (No)	57,200	24¼	26	23⅛	25	+1
25⅛	13⅛	1.00	Standard Oil, Ind. (25)	86,100	21⅜	22⅛	21¼	21¼	− ½
17⅝	7	....	Standard Oil, Kansas (25)	17,600	15⅝	17⅝	15	16¼	+ ¾
15⅞	8⅞	1.20	Standard Oil, Ky. (10)	15,800	10⅞	11¼	10	11	+ ⅛
37⅜	19⅞	‡2.00	Standard Oil, N. J. (25)	118,900	29	31⅜	29	30¾	+1¾
39⅞	24¾	‡1.00	Sun Oil (No)	1,400	36½	37	36	36	− ½
18¼	9¼	1.00	Texas Corp. (25)	77,300	13½	14½	12	13	− ½
5⅝	2	....	Tide Water Assoc. (No)	48,600	3⅝	3⅝	3	3⅜	− ⅛
15⅜	8	1.00	Union Oil of Calif. (25)	8,500	10	11⅝	9¼	10¾	+ ¾
1⅛	⅛	....	Venezuelan Petr. (5)	4,000	¼	¼	⅛	⅛	− ⅛

Since close of last month's table. † Paid for 1931—no regular rate. § Including extras. * Ex Pan American Foreign. ‡ Also paid 3% in stock in 1932.

for 1931. During the third quarter of 1932 the company purchased acreage in East Texas on which considerable development work was done. Due, however, to the 15-day shutdown in that field in December, the company was not able to derive any profit from its operations there, but with the field now back on a producing basis these properties should begin to contribute to profits.

IT IS EXPECTED that Amerada Corporation will report a net profit of approximately $1,225,000 equivalent to $1.60 a share as compared with a net loss of $1,701,648 after all deductions in 1931. Earnings resulted entirely from operations as it is understood that there were no sales of leases or other such major transactions as in the past. It is also reported that, notwithstanding the fact that the company paid $2 per share in dividends last year and engaged in an active campaign of drilling and lease acquisition, it ended the year in at least as strong a cash and current asset position as at the beginning of 1932, when the current ratio stood at 18-to-1. The company has paid dividends without interruption since 1922.

ANNUAL report of Atlantic Refining Company is indicative of the earnings improvement witnessed by the industry generally in 1932. The company reported for the year ended December 31, 1932, net income of approximately $3,918,000 equivalent to $1.45 per share of common stock as compared with $513,749 or 19 cents a share in the previous year.

ANOTHER major company to issue a preliminary report covering operations for 1932 is Sun Oil Company, which also showed substantial improvement in earnings for 1932 over the preceding year. Net income amounted to $4,198,046 equal after dividends on preferred stock to $2.35 a share of common stock outstanding as compared with net profit in 1931 amounting to $3,107,147 equivalent to $1.63 per share.

C. C. BAILEY

London: January

FLUCTUATIONS in oil share prices reflect a partial recovery from the shock given to confidence at the end of November by the Persian Government's move to annul the Anglo-Persian concession. Some professional support has been given, and there has been a spasmodic demand from the Continent for certain international shares. The public, however, remained completely out of the market until towards the close of December, and then only came in for relatively small investment lots. The result was a rather quiet opening to the New Year, although most other sections of the London stock market started 1933 with a blaze of strength. Investment demand for oil shares early in January was based on the belief that the current year will see an upturn in world trade, from which the industry should benefit. Such buying naturally springs from a moderately long view of prospects. From the shorter viewpoint of the more speculative element, the market is evidently not considered attractive at the moment. The market turned dull toward the end of January as a result of growing fear of a reduction in British petrol prices following weakening prices for United States' crude. While other factors such as the political situation and public opinion normally affect the British market, the lower crude prices in America are at present the most important factor in the situation. In

London Stock Exchange Prices

1932-1933 High	1932-1933 Low	Last Year's Div. % per Ann.	Share	December 11 1932-January 12 1933 First	High	Low	Last	Change
1 1/16	9/32	3½	Anglo-Ecuadorian	5/8	2 1/32	5/8†	5/8†	.....
1⅞	3 1/32	10	Anglo-Egyptian "B"	1 9/16	1 11/16	1 9/16	1 9/16	.....
2 29/32	1 3/16	5	Anglo-Persian	1 29/32	2	1 15/32	1 13/16	+ 3/32
1⅛	15/32	25	Apex Trinidad (5s.)	1 1/32	1 1/16	1	1 1/32	.....
¾	⅜	....	Attock	½	17/32	7/16	17/32	+ 1/32
9/16	5/16	5	Brit. Borneo (6s.)	1 3/32	1 9/32	1 3/32	1 9/32	+ 3/16
¼	⅛	....	Brit. Burmah (8s.)	5/16	5/16	9/32	5/16	.....
¼	1/16	....	Brit. Controlled (85)	5/16	7/32	5/16	7/32	+ 1/32
½	1/16	....	Brit. Controlled Pfd. (85)	5/16	1 5/32	7/16	1 5/32	+ 1/32
3 15/32	1 13/16	17½	Burmah	2 31/32	3 5/32	2 27/32	3 1/16	+ 3/32
3/16	7/32	....	Canadian Eagle (No par)	9/32	1 5/32	9/32	5/16	+ 1/32
⅞	½	....	Creole (No par)	29/32	1 3/16	¾	1 3/16	+ 1/32
7/32	1/16	....	Kern River (10s.)	⅛	⅛	⅛	⅛	.....
2 5/16	1 1/32	12½	Lobitos	1 15/16	1 27/32	1 25/32	1 13/16	.....
15/32	¼	....	Mexican Eagle ($4 Mex.)	3/16	15/32	15/32	3/16	.....
19½	4½	....	Pan American "B" (New)	17¾	17¾	17	17¾	.....
1 1/16	5/32	....	Phoenix	9/16	19/32	17/32	9/16	.....
20½	10¼	6	Royal Dutch (fl. 100)	18	19⅛	17¾	19⅛	+1⅛
2 29/32	1 7/16	7½*	Shell Transport	2⅜	2 17/32	2 13/32	2 15/32	+ 5/32
9/16	3/16	4	Steaua Romana	3/16	3/16	3/16	3/16†	.....
2¾	1⅛	12½	Trinidad Leasehold	2 9/16	2 21/32	2 7/32	2 19/32	+ 1/32
9/32	3/32	....	Untd. Brit. of Trinidad (6s. 8d.)	7/32	¼	5/16	¼	+ 1/32
1 23/32	⅞	10	Venezuelan Oil Concessions	1 19/32	1⅝	1 9/16	1 19/32	.....

Nominal value of shares £1 unless otherwise stated by bracketed figures.
* Denotes Tax-free dividend. † Denotes "Ex-dividend" price.

addition to the fear of a reduction in petrol prices there is, however, the hope that the American cut in prices may improve the statistical position and ultimately reinforce proration. Hence it will be considered most unfortunate if this reduction is allowed to bring about lower prices prematurely in Britain.

There is at present only a small speculative position on the "long" side in oil shares, and the technical position of the market appears healthy. But prices are hardly likely to go ahead again strongly until both the American crude and gasoline market and the Anglo-Persian concession are settled. Progress in settling the Anglo-Persian dispute is reported as a result of agreement on the part of both parties to attempt to negotiate a new arrangement.

GRADUAL recovery has taken place in Anglo-Persian shares since the ordinary stock declined to 1-9/16 soon after mid-December, but sharp day-to-day fluctuations reflect continued uncertainty as to the final outcome of the concession dispute. Market confidence was partially restored by the Persian Government's assurance that working of the company's properties would not be impeded pending full examination of the British and Persian cases by the League of Nations Council. This assurance gave rise to the hope recently that private negotiation would lead to a new agreement before the question was discussed in detail by the League at the end of January. Those who held that such an agreement was probable have been inclined to criticise the intervention of the British authorities in the dispute. But since the British Government is the largest shareholder in Anglo-Persian, in addition to being the natural defender of its overseas interests, it is only reasonable to suppose that the role of principal contestant was only undertaken by Britain after consultation with the Anglo-Persian directors. It is still considered probable in the market that the final result of the D'Arcy Concession affair will be a new Anglo-Persian concession, possibly for an extended term, but with royalties based on output instead of profits. Having regard to the attitude of the Persian authorities, however, it is taken for granted that the effect will be more income for Persia, and less for the company, whatever form any new arrangement may take.

DECLARATION by Lobitos Oilfields of a 5 percent interim dividend on account of 1932 did not surprise the market. It was regarded, nevertheless, as a welcome indication that nothing has gone seriously wrong with the programme of the company and its subsidiaries. At the annual meeting in June last, Mr. H. C. R. Williamson, the chairman, expressed the hope that an interim would be paid. The company's tankers, which earned a small profit in 1931, were expected to do no more than earn their depreciation charges for 1932, but restriction of drilling and other expenditure, together with higher average selling prices, should have provided the Peruvian operating subsidiary with improved financial results from its operations. Resumption of dividends recently by Anglo-Ecuadorian Oilfields, in which Lobitos has a large shareholding, will also have helped the latter concern's revenue. As the dividend now declared by Lobitos is the same as the interim for 1931, a repetition of the total distribution of 12½ percent for that year is generally expected. As usual, there are some optimists who are already forecasting an even higher return when the accounts are submitted next June.

FULL accounts of Apex (Trinidad) Oilfields for the year to September 30, 1932, amplify and explain the excellent financial results announced in WORLD PETROLEUM last month. Selling prices were lower than in 1930–31, but this was met mainly by a reduction in working costs. Production was also slightly increased, the year's output of 3,798,368 bbl. comparing with 3,655,358 bbl. As a result, oil profits, at £332,457, were within a few thousands of those for the previous year, and the year's dividend was restored from 20 percent in 1930–31 to the 1929–30 level of 25 percent. The general reserve transfer from profits for the past year is only £40,000, against £100,000 a year ago, but the latest addition will increase the general reserve account to £220,000, against an issued capital of £500,000, and the balance sheet shows a very strong financial position. The company, which is closely associated wtih Trinidad Leaseholds, owes much of its present success to the conservative financial policy always followed by the directorate. During the past financial year, a sum of £115,058 was written off wells, and up to date 91 percent of all wells have been amortized, the whole of the wells now standing in the accounts at £99,948. As this sum includes £41,918 for the cost of new wells and locations not yet due for amortization, the year's production, which realized a profit of £332,457, was obtained from wells with a book value of only £58,030.

ALTHOUGH the Apex (Trinidad) distribution, and the good results announced at the same time, had little effect on Apex shares, they attracted attention to the shares of British Borneo Petroleum Syndicate, which has a considerable holding in the Apex company. This holding has been written down in the British Borneo books to a sum equal to only 5s. per Apex share, against an existing market quotation of over 20s. Among its other interests the syndicate is entitled to a royalty on production from the Brunei field in Borneo, which is being developed by the British Malayan Petroleum Company (Royal Dutch-Shell Group), and it also has a participation with Anglo-Persian in a concession over 54 square miles in the State of Brunswick, Germany. Both these interests are said to be developing satisfactorily. It is calculated in the market that the royalty from the Brunei area already equals about 5 percent per annum on the syndicate's capital. The first well on the Brunswick concession was expected to be completed by the end of 1932, and latest reports indicate that a depth of 1,700 ft. has already been reached. British Borneo also has shareholdings in Roumania, which are now carried in its books at a nominal figure. This combination of possibilities in the syndicate, coupled with the increase in its income from Apex, has raised its shares to the position of popular speculative favorites. The current price of 19/32 compares with a low level of 3/16 for 1932, although 333,340 new 6s. shares have been offered at par to shareholders.

THERE is some ground for cynicism in the wide publicity given in the Press here to the establishment of a record output for 1932 by Phoenix Oil and Transport. Production last year totalled 6,352,997 bbl., an increase of 1,543,836 bbl. on the figure for 1931. As recently as 1928 it was only 2,737,756 bbl. The company's predominant interest consists of control of a large group of Roumanian producers, and the rapid increase of output is typical of what the Roumanian industry has been doing. Expansion of production on an overstocked world market may have been good business for the moment from the point of view of the company and its associates; but it has certainly not been beneficial either to the Roumanian industry as a whole or to the international oil position.

ALEC H. DAY

Imports from U.S.S.R. Jan.–Sept., 1931 and 1932

Barrels of 42 U. S. gallons

	1932	1931
Motor Spirit	1,415,728	2,865,888
Other Spirit	20,824	.....
Kerosene	850,680	1,524,892
Lub. Oil	239,064	307,482
Gas Oil	263,053	262,794
Fuel Oil	852,593	886,431
Total	3,641,942	5,847,487